February 2012

Florida Orthophotography Business Plan Appendices

Appendix A: Summary of Current Status of Imagery

This document is a summary of information gathered during the outreach portion of the Florida Aerial Imagery Business Planning project. The impressions of participants provided in regional workshops, an on-line survey of imagery users, and interviews with representative imagery users are presented in this document.

Table A-1. Stakeholder Participation

Participation Method	Number
Workshops	162
On-line Survey	274
Interviews	20
Project e-mail list	731

Current Imagery Situation

The information presented in this document has been collected from users and producers of aerial imagery in Florida through a series of five (5) workshops, interviews with representatives of key imagery users constituencies, and an on-line survey. In total, over 700 individuals have been provided an opportunity to provide input regarding their requirements for aerial imagery through this process.

Overall, Florida's aerial imagery is current, is of sufficient spatial accuracy and resolution to meet the needs of users, and is general available through the public domain to users. This is in part due to requirements for counties and the Department of Revenue to collect aerial imagery on a 3 year cycle to comply with Florida Statue Section 195.022. Cooperation between the Department of Revenue, Department of Transportation, Water Management Districts, and the Federal Government has improved greatly over the past several years which has greatly reduced duplication of efforts related to collection of current and accurate aerial imagery.

The current imagery situation in Florida is not without challenges. For example, Florida Statute Section 192.002 requires the Department of Revenue to provide imagery for counties with a population over 25,000 at the property appraiser's expense is viewed negatively by county governments. In some cases the counties have decided to procure imagery independently, without the benefit of coordination with a broader community, to fulfill these requirements. Although the Statute has resulted in making current imagery available it has the potential for unintended consequences; de-centralizing acquisition projects, increasing costs, fragmenting distribution opportunities to imagery users, and variable quality.

Ortho Imagery Characteristics

The Statute 192.002 requirement that Counties have updated imagery for tax assessment along with broad open record laws has made imagery widely available. Generally the imagery available meets national map accuracy standards and has sufficient pixel size to meet intended needs. The following section provides a summary of ortho imagery characteristics including source, age, resolution,

Some organizations produce their own aerial imagery within the organization with the help of equipment such as above.

Ortho Imagery Source

Many of the users of Florida ortho imagery receive it from state, regional, local, and federal data producers outside of their organization. Frequently the ortho imagery is in the public domain and available to them without significant cost or use restriction, as shown in Figure A-1. However, a significant number of users (108) responded that the imagery they use is produced by a private firm that licenses the use of their data. ***Note that in the survey multiple responses were permitted to this question.*** These numbers may reflect using of aerial ortho imagery from public domain sources while also using imagery from

Figure A-1. What is your source for the ortho imagery you use?

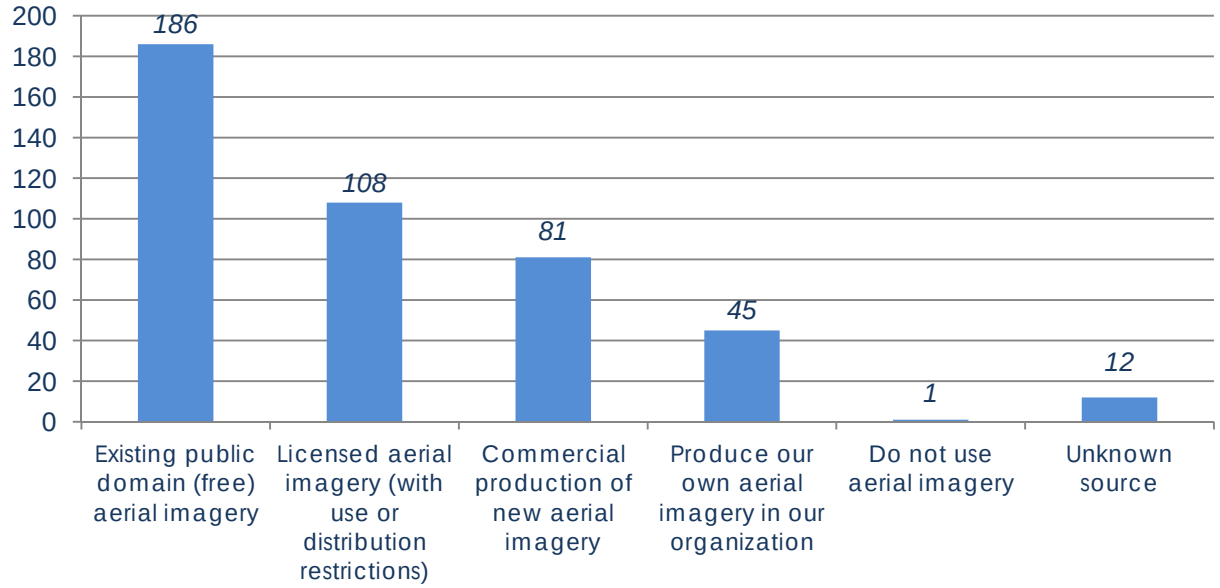
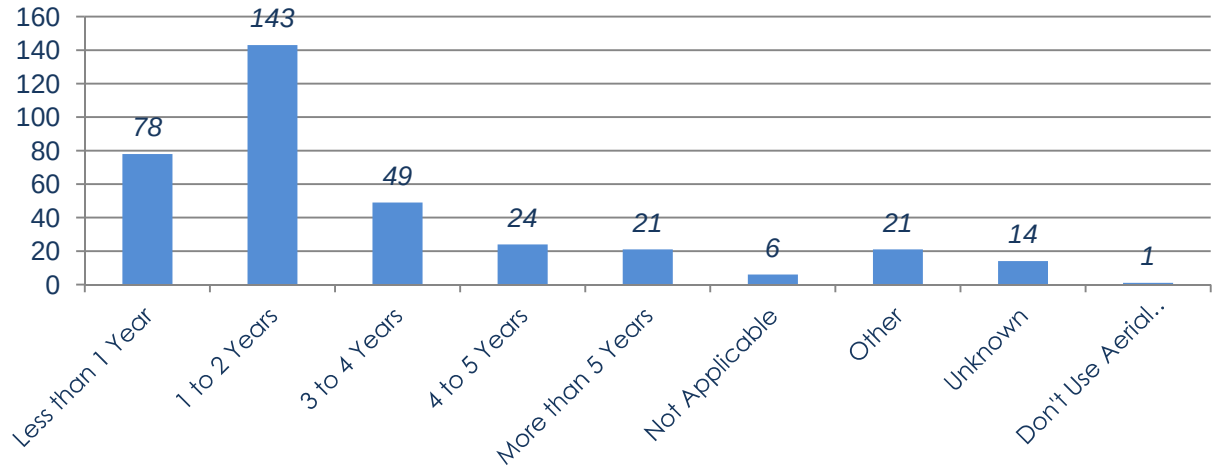


Figure A-2. What is the approximate age of your ortho imagery?



another source that may have restrictions on use.

Ortho Imagery Age

The majority of respondents to the on-line survey reported that their organization's ortho imagery was less than 3 years old. The most common response was "1 to 2 years" (143) with "less than one year old" being the next most common response (78). This highlights the active collection program driven by Statue 192.002. Some respondents reported that the approximate age varied by county and that their organization uses a range of current and historic data. Figure A-2 shows the approximate age ranges of ortho imagery data and the number of corresponding responses.

Ortho Imagery Resolution and Type

Respondents to the survey were asked to describe the characteristics of the ortho imagery they use. For each imagery type (e.g. Natural Color, False Color Infrared, Black and White), the majority of respondents selected "unknown/other" for the resolution. This suggests that for many users of aerial imagery specific technical details are not critically important.

The highest reported characteristics were Natural Color at ~12" pixel (95 responses) and Natural Color at ~6" pixels (62 responses). Table A-2 shows the total responses for each type and resolution.

The Department of Revenue (DOR) minimum requirement for 12" pixel resolution seems to be driving communities to accept that as their standard. This 12" resolution was identified as being insufficient to meet business needs including change detection supporting property tax appraisal, environmental monitoring, and emergency response. The number of organizations with approximately 3 inch pixel resolution supports this point.

Interestingly there remain very few users of imagery from a film source, which is consistent with national trends away from film to digital imagery cameras. Few users are utilizing satellite imagery and some of the survey responses included responses that are not presently available (3 inch pixel

Table A-2. Ortho Imagery Characteristics.

Resolution	Number of Respondents								
	Natural Color	*False Color Infrared*	*Black & White*	*Leaf-On*	*Leaf-Off*	*Aerial: Film*	*Aerial: Digital*	*Satellite*	*Oblique*
~3" pixel	23	6	5	3	6	3	14	4	5
~6" pixel	62	20	14	6	17	6	26	0	21
~12" pixel	95	37	21	10	33	7	41	5	14
~18" pixel	6	1	6	3	3	1	4	3	3
~24" pixel	8	5	7	3	4	0	2	2	0
~36" pixel	24	23	9	9	6	2	7	6	0
~72" pixel	1	2	2	0	0	1	0	2	0
>72" pixel	2	2	0	0	0	0	1	8	0
Other/ unknown	65	73	71	70	69	78	84	78	74

resolution from satellite imagery for example).

Ortho Imagery Accuracy

The majority of respondents (61%) reported that the imagery currently available to them meets National Map Accuracy Standards for horizontal spatial accuracy, while 37 percent did not know whether their imagery meets the standards. Alternatively, two percent reported that the imagery currently available to them does not meet National Map Accuracy Standards for horizontal spatial accuracy.

Ortho Imagery Budgets

There is a significant public investment on an annual basis in the collection and processing of ortho imagery. Table A-3 summarizes the survey responses on annual imagery and related cost investments.

The on-line survey requested information from respondents about the annual investment in aerial imagery for acquisition, quality control, storage and distribution. Specifically the question requested the responding individual to select a range of expenditures that have been spend on average annual over the previous 5 years. A majority of respondents did not provide an estimate; presumably these were users of free public domain imagery rather than representatives of organizations that routinely procure imagery.

Table A-3. Annual Investment in Imagery.

Investment Source	Total
Projected Annual County Investment	$ 3,075,582
Reported Other Public Investment	$ 3,631,500
Reported Private Investment	$ 1,355,000
Estimated Annual Investment	$ 8,062,082

Only 27 of the 67 Counties submitted information on their total expenditures related to aerial imagery. The average per square mile expenditure for those Counties was $142.42. If we assume these Counties are representative of the entire state, and approximately 1/3 of the State is collected on an annual basis, the approximate annual expenditure for ortho imagery by counties would be $3,075,582[1]. Several urban counties collect imagery on an annual or bi-annual basis and a number of non-county entities also collect imagery. The total likely expenditure on ortho imagery and related efforts in the state, when this county projection is combined with other government entities ($3,631,500) and private firms ($1,355,000) the total potential expenditure on an annual basis may exceed $8 million. However, it is more likely that annual investment in ortho imagery in Florida is in the rage of $3 to $3.5 million.

Current Ortho Imagery Issues or Problems

While most survey respondents reported that the ortho imagery currently available to them meets their needs, for many their needs were only partially being satisfied. Figure 3 shows the percentage of respondents whose needs were met, partially-met, or not met.

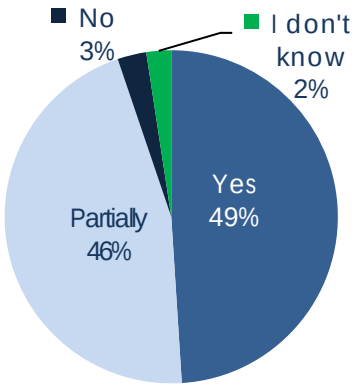


Figure A-3. Does the ortho imagery currently available meet your needs?

Obstacles to Getting Necessary Imagery

A significant impediment to securing the funding necessary to acquire aerial imagery has been a lack of understanding that imagery historically available on Google Earth, Bing Maps, or similar on-line mapping services is not sufficient to meet the needs of government. Participants indicated that they encounter resistance from elected officials and organizational leadership making budget decisions who believe that imagery available for viewing on public web sites should meet the needs of their organization.

Imagery that is available for viewing on web sites (Google, Bing, and other sources aerial photography.) does not meet the needs of government entities for a number of reasons:

- No control over specifications or scheduling
- The date of acquisition is often not available so they cannot be used for certification of tax rolls

[1] [1] This estimated annual expenses for ortho imagery is based upon the assumption that $142.42 is a representative cost currently being paid per square mile for acquisition, processing, QA/QC, and distribution. If 1/3 of Florida's 64,785 square miles (or 21,595) are collected annually the total expenditure would be $3,075,582. [Calculation is (64,785 square miles/3) X $142.42 per square/mile = $3,075,582]

- Spatial accuracy of the imagery cannot be validated
- Quality control procedures are not documented or are too vague to be of value
- Ability to use and distribute imagery outside of a single web site can be either difficult or impossible
- A clear chain of custody is impossible to establish so using the imagery to support code enforcement actions may not be possible.

The turnaround time on imagery from collection through quality control creates issues. It was reported in workshops and in individual interviews that it can be as long as a year before imagery is fully available for use.

Procurement can be difficult for individual counties since they lack expertise in contracting and working under the CCNA.

Table A-4. Importance of Business Drivers.

Business Driver	Percent Rating					Average Rating
	Critical Importance 5	4	3	2	*Little or No Importance* 1	
Reduction in labor or operational costs	29%	26%	23%	11%	11%	3.50
Improvement in data quality and consistency	58%	30%	11%	0%	1%	4.44
Explore new sources for revenue generation	9%	8%	19%	12%	51%	2.11
Enhance/increase inter-organizational partnerships	11%	22%	29%	19%	19%	2.87
Economic/business development and improvement	12%	16%	18%	15%	39%	2.46
Infrastructure improvement and maintenance	28%	25%	15%	7%	25%	3.25
Environmental protection/Natural Resource Enhancement	48%	23%	9%	10%	11%	3.88
Improved land use planning and decision making	42%	26%	10%	7%	16%	3.29
Emergency preparedness and response	38%	21%	16%	7%	18%	3.90
Enhancement of health for citizens	9%	15%	24%	16%	35%	2.47
Enhancement of quality of life for citizens	17%	20%	27%	14%	22%	2.96
Support quality and availability of educational and training opportunities	6%	11%	26%	21%	35%	2.31

What Drives the Need for Imagery?

To understand organizations' reasons for using aerial imagery, the survey solicited information on organizations' primary "business drivers." A "business driver" is a major program area, organizational need, or challenge that geospatial technology can help support or address. Respondents were asked to rate the importance of various business drivers to their organization and its use of aerial imagery. A rating of 5 indicates that the business driver is of critical importance, while a rating of 1 suggests that it is of little or no importance. For each business driver, Table 4 shows the percent of responses within each rating as well as an average rating. The highest percentage and rating are shown in bold.

Participant Comments on Current Ortho Imagery Programs

During the outreach portion of this project efforts were made to collect impressions of the current status of aerial imagery efforts in Florida from participants in workshops and respondents to the on-line survey. Specific questions about what is working well, what needs to be improved, and what benefits are received from imagery were asked of stakeholders during workshops, in depth interviews, and in the on-line survey. The text below summarizes the general impressions of those individuals.

What is Working Well

As cited earlier in this document, overall there is currently high quality imagery available for Florida. This is largely due to efforts from the Departments of Revenue and Transportation and mandated imagery collection by counties to support property tax management.

The cooperative program between DOR and DOT allows counties without sufficient funds to meet mandated imagery requirements and has good support from many participants.

There has been good cooperation between the State, water management districts, and counties.

The USGS contribution to imagery acquisition has worked very effectively.

Most users of imagery can "harvest" the data they need from FREAC or other public sites at no cost.

Some counties, particularly urban areas, have been successful in developing partnerships to acquire ortho and oblique imagery.

What is Not Working or Could Be Improved?

Generally outreach participants believe that no individual or organization has authoritative responsibility for structuring cooperative imagery programs. There is a belief that the staffs of DOR and DOT that are involved in supporting cooperative acquisition programs are also required to perform other duties and thus cannot spend the time required to effectively structure collaborative programs.

There was a voiced belief in the aerial imagery user community that organizations would cooperate through funding, providing quality control services, supplying

ground control, or other activities if there was a formal mechanism to better enable this process. If there were a formal mechanism for enabling this cooperation, and improving communication between stakeholders well in advance of a project there would be more organizations working together.

Senior management, particularly those controlling budgets, doesn't understand the value of imagery or the important distinctions between that available on Google or Bing and that necessary for official activities.

For some counties Statute 192 has created budget concerns since it requires them to fund ortho imagery collection and processing a minimum of once every 3 years. This requirement was identified as making cooperation more difficult than it might be under different circumstances.

The capabilities available through Florida and Federal on-line image distribution services (for example Florida State University's FREAC and LABINS.org) are not used by some urban counties. Since the counties don't provide their imagery to these services for free on-line distribution there is no one stop shop for all statewide imagery. For urban areas a visit to the county property appraiser can often be required to get the imagery necessary.

Participants believe there are no standards that can be used by everyone to make sure that minimum requirements are achieved.

It is believed that the imagery programs managed by DOR or DOT do not allow for optional upgrades such as oblique, CIR, stereo pairs, higher resolution, or development of planimetric data. [The DOR program in fact does allow for upgrades if the county is willing to fully fund the additional costs.]

Natural resource efforts can be hampered when the study region, such as a watershed, covers multiple counties and the imagery available is from different years and was created by different vendors to slightly different standards

Utilities and some other imagery users are "free riders" getting the data from the public domain but not providing any support for the development or maintenance of the resource they depend on.

Resolution requirements for urban and rural areas are different and this is not recognized by the standards promulgated by DOR, DOT, or USGS. Many participants identified a need for 6 or 3 inch resolution imagery in urban areas rather than the standard 1 foot required.

It is very difficult to determine who is doing what and when in the area of aerial acquisition. With public budgeting and procurement a long lead time can be required to participate in a joint project. The lack of that long lead time can jeopardize the ability of some governments to participate.

Procurement for cooperative projects can be difficult since procurement officials often require using contract language and contracts specific to their jurisdiction. This can make using procurement vehicles such as those in place with USGS, the

Department of Revenue, or the Water Management Districts impossible. Cost share opportunities are lost because of the bureaucratic difficulties imposed by procurement.

Budget cycles between potential partners can be out of synchronization making completion of image capture, processing, and QA/QC in a single budget year for all contributors difficult.

Finding the imagery required can be difficult because users are not aware of available imagery servers or where to find county specific ortho imagery if it is not already available on those servers.

Priorities of the State and local or regional governments can be different. This is also true of necessary resolution and imagery derived products required.

Benefits from Ortho Imagery

The benefits that have been received through having imagery available are significant. Through the on-line survey over $12.4 million of tangible benefits were identified by public and private entities. A common sentiment from those that have participated was the aerial imagery is essential for business operations. It was common to hear, "We simply can't do our job without aerial imagery."

Respondents to the on-line survey were asked if the availability of aerial imagery resulted in certain benefits for their organization. Table 4 shows the percentage of yes, no, and not applicable responses to a variety of potential imagery benefits. Respondents most frequently answered "yes" "improved decision making" (98%) and answered "yes" least frequently to "protection from catastrophic records loss" (21%). Respondents were also asked to provide specific examples of how aerial imagery has benefited their organization. Examples collected through this question include discipline-specific benefits, as well as more general imagery benefits. The most comment benefits described were pre-planning for fieldwork and/or reduced time needed in the field, detection of land changes, existing conditions research, awareness of land features (natural and manmade), facilities mapping, property assessment, crime analysis, and security planning.

To more fully understand the extent of these benefits, the survey asked respondents to estimate the value that aerial imagery has provided their organization during the past five years (in terms of either cost savings or increased revenue). For most categories, respondents responded with "Unknown/NA" for the amount of savings or increased revenue. Table 4 displays the number of responses for each category and each savings/revenue range.

Specifically, one survey respondent stated that aerial imagery helped their organization to "prevail in a $65,000,000 lawsuit against the state that might have cost billions in future judgments as case law." A County identified savings of $150,000 per year in preliminary design costs using imagery combined with LIDAR.

St. Johns River Water Management District was able to save a County $40,000 through leveraging funds available for a cooperative imagery project.

Tax rolls are updated annually. Frequently improvements to real property that are not being appropriately taxed are identified from aerial imagery. One example presented was the discovery of a house that was eventually appraised for $1.5 million that had not been on the tax roll. Adding this single structure may have added as much as $23,000 per year to tax collections (estimated using Orange County property tax rates). While identifying a single property with this high a value is somewhat rare given the rigorous building permit and inspection regime in most communities, a number of smaller improvements would be expected in nearly every community. These smaller improvements such as adding a garage or barn to a site, construction of a dock or swimming pool, or adding to the size of an original structure, can be identified and added to the tax roll.

Several specific intangible benefits (those that do not easily have a specific dollar benefit attached to them) were identified by multiple respondents to the on-line survey

Table A-5. Has the availability of ortho imagery resulted in any of the following benefits?

Benefit	Yes	No	Not Applicable
Improved Decision Making	98%	0%	2%
Improved Timeliness and Quality of Data and Services	95%	2%	3%
Improved Mission Performance	94%	1%	5%
Improved Staff Productivity/Labor Cost Savings	91%	4%	5%
Improved Public Satisfaction	81%	5%	14%
Protection/Enhancement of Natural Resources	76%	4%	20%
More Effective Management/Allocation of Field Services	76%	8%	16%
Enhance Public Participation and Awareness	72%	9%	20%
Catalyst for Partnerships and Information Sharing	66%	12%	22%
Reduction in Duplication and Redundancy	64%	16%	16%
Reduced Travel Times and Transportation Costs	61%	18%	21%
Increased Accountability and Transparency	52%	17%	32%
Avoidance of New Costs	51%	19%	10%
Savings in Capital Project Design and Construction	49%	17%	34%
Legal Compliance/Protection Against Expensive Legal Action	48%	11%	41%
Cultural Resource Enhancement and Protection	47%	17%	36%
Reduced Costs from Asset Management	46%	19%	35%
Reduced Costs Through Joint Funding	45%	21%	34%
Code Compliance/Improved Voluntary Compliance	43%	11%	45%
Savings of Life and Property	40%	13%	47%
Support for Economic Development Initiatives	36%	23%	41%
Increase in Revenue (improved collection of taxes, fees, fines)	31%	22%	47%
Improved Public Health and Wellness	28%	21%	51%
Protection from Catastrophic Records Loss	21%	24%	55%
Other	10%	9%	81%

or participants in the workshops:

- Post disaster imagery allows for quick damage assessment and post event recovery
- Monitoring of environmental restoration efforts to make sure they are effective is not possible without imagery.
- Aerial imagery is used in every public project to boost understanding, support improved decisions, and communicate information to the public
- Fair and equitable taxation is made possible by having imagery available because untaxed improvements can be identified so everyone is paying their fair share and confidence in the property tax system is improved.
- Code enforcement has been enhanced through the use of imagery. While in some cases imagery has been used to support enforcement actions and fines it is better used to encourage voluntary compliance since it improved the likelihood of violations being identified.
- Less field work is required when staff can use imagery to identify changes and
- conditions. This makes staff work more efficiently and reduces the costs associated with field visits.
- Imagery as a backdrop for GIS vectors improved the accuracy and credibility of those data and makes it easier to understand by the public and elected officials.
- Public safety organizations rely on imagery to support tactical operations improving the safety and effectiveness of law enforcement officers.

A common theme from participants was that the general public expects, in many cases demand, that there be high quality recent imagery available. It is critical to building the credibility of government and is utilized by private citizens and firms.

NEEDS FOR COORDINATION

The Aerial Imagery Business Plan currently under development will need to address the structure under which future cooperation and coordination will be undertaken. To better understand the current status of cooperative imagery projects, stakeholders were asked to identify why coordination in aerial imagery programs would be beneficial, what is currently not being done, and activities that should be considered.

A lack of a coordinated statewide approach to aerial imagery acquisition and distribution means that we are not taking advantage of economies of scale in the acquisition and processing of imagery, are duplicating efforts (rarely in collection but frequently in distribution) and not maximizing the efficiency of technical and human resources.

Some respondents suggested that resources are not being used as efficiently as they could be because we are not approaching imagery projects cooperatively. Human resources are not effectively used when multiple organizations are performing

QA/QC services since it takes time to develop the skills to effectively and efficiently perform these tasks and being called upon to use them only once every three years means re-training or re-learning. Technology resources may also not being fully utilized under the current situation. An example cited by a participant was that the DOT aircraft and sensor may not be fully utilized since it may be idle while the weather and sunlight conditions are appropriate for image collection.

The biggest factor in how useful imagery is to us is the age of the imagery. If all the organizations (DOT, DEP, DOR) coordinate their collection efforts and/or budgets there would be more current imagery available for more areas in the state.

Through broad cost sharing a superior product (in terms of pixel resolution, spatial accuracy, and currency) can be achieve at a reasonable price.

There are opportunities missed for "buy-ups," where local government or water management districts could pay for additional products or improved image resolution, simply because of a lack of coordination.

A lack of coordination means Florida lacks a unified voice to USGS and other potential Federal funding partners so the priorities of the entire imagery community may not be heard.

There are currently "free riders" using public domain data that would contribute to acquisition of the imagery or to improving the quality of the imagery if approached. This may include public and privately owned utilities (electrical, water, sewer, natural gas, etc.) and some smaller public jurisdictions. These potential contributions are missed because they are never solicited.

Appendix B: Review of Existing Technical Standards

The table below summarizes the key points of the "Florida Statewide Base Digital Orthophotography Program Requirements", dated November 21, 2011 and a pair of USGS Documents: "U.S. Geological Survey Base Orthoimagery Specification (Draft version 3.1)," dated August 23, 2011.

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Project Area/Geographic Extent	Agency provides an outline of the project area.	Requires 300 (+/- 30) meter or 1,000 (+/- 100) foot buffer on all exterior project edges	The buffer requirement should be expanded to include complete tiles or chips that are adjacent to the project area.
Sensor/Calibration	Requires current USGS type certification with document bore-sight calibration within 6 months.	Aerial Sensors/Cameras used to acquire project imagery shall have current USGS certification, or with digital sensor a current USGS digital aerial sensor type certification.	No changes are necessary
Image Spatial Resolution	Original spatial resolution no less than 0.5 feet and no more than 1.06 feet.	This is base specification for 0.3 meter (30-centimeter) or 1 foot data.	

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Image resampling	Imagery can be resampled to meet the image resolution requirements.	Orthoimagery produced under this specification shall not be resampled form the original image, original scan, or original capture, with resolution greater or less than the following: For .3 meter GSD maximum 0.15m minimum 0.32m; for 1 foot GSD, maximum .5 ft, minimum 1.06 ft.	
Image Color	The Consultant will deliver only the Orthorectified color infrared and natural color imagery.	Natural color. Color-IR and 4-band are optional.	The USGS specification considered anything beyond natural color to be optional. This may be appropriate for Florida as well.
Image Color Balance	The natural color, RGB, bands will be color balanced across the entire study area to the greatest extent possible to allow viewing of the image tiles as a visually seamless mosaic. Care should be taken during radiometric processing to avoid loss of detail in shadows and overexposure on bright surfaces such as bare ground and light colored building roofs.	Orthophotos shall be tonally balanced to produce a uniform contrast and tone across image files covering the entire project. Changes in color balance across the project, if they exist, shall be gradual. Abrupt tonal variations between image files are not acceptable.	In both specifications this language is necessarily vague and subject to interpretation. Unfortunately this will continue to be an issue with imagery but there is little that can be done to correct the problem.

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Data collection window	October 1 to March 15 with a preference for imagery acquired prior to January 30.	Leaf off in year of task order with allowance for acquisition prior to leaf-on in next calendar year if necessary.	The data collection window as specified by Florida is appropriate given the climate zones. However, it should be modified to stress that early and late in the flying window may require an evaluation of the leaf status since unseasonable weather may result in late leaf fall or early leaf out.
Data collection environment	All images will be obtained under cloud free conditions and will be free of obscuring haze, smoke, or other atmospheric conditions. All images must be collected with a sun angle no less than 30 degrees.	Imagery shall be acquired under these conditions: leaf-off, no snow on ground, non-flood conditions, sun angle is greater than 30-degrees to minimize shadows.	Combine the restrictions on image acquisition to include no snow and non-flood conditions.
Horizontal Accuracy	Horizontal accuracy of the final product shall be determined using well defined photo identifiable check points. Computer local horizontal accuracy shall meet or exceed 5.06 feet at the 95% confidence interval as specific in the FGDC "Geospatial Positioning Accuracy Standards, Part 3: National Standards for Spatial Data Accuracy."	Horizontal accuracy shall not exceed 3.0-meters NSSDA 95% confidence (0.88-meters Root Mean Squared (RMSE) errors XY (0.62 meters RMSE X or Y). Accuracy shall be determined using well defined test points. For GSD 0.30 meters the horizontal accuracy must meet 1.52 meters at the 95% NSSDA; for 1 foot GSD the horizontal accuracy must meet or exceed 5.06 ft at the 95% confidence interval for NSSDA.	Florida requirement is in compliance with USGS requirement.

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Horizontal Accuracy	Horizontal accuracy of the final product shall be determined using well defined photo identifiable check points. Computer local horizontal accuracy shall meet or exceed 5.06 feet at the 95% confidence interval as specific in the FGDC "Geospatial Positioning Accuracy Standards, Part 3: National Standards for Spatial Data Accuracy."	Horizontal accuracy shall not exceed 3.0-meters NSSDA 95% confidence (0.88-meters Root Mean Squared (RMSE) errors XY (0.62 meters RMSE X or Y). Accuracy shall be determined using well defined test points. For GSD 0.30 meters the horizontal accuracy must meet 1.52 meters at the 95% NSSDA; for 1 foot GSD the horizontal accuracy must meet or exceed 5.06 ft at the 95% confidence interval for NSSDA.	Florida requirement is in compliance with USGS requirement.
Horizontal Datum	The latest NGS realization of the North American Datum of 1983 (NAD83) with projection referenced to the appropriate Florida State Plane Coordinate System	Projected in the North American Datum of 1983 (NAD83) using the corresponding native Universal Transverse Mercator (UTM) or State Plan zone	Florida requirement is in compliance with USGS requirement.
Horizontal Units	US Survey Feet	Preference given to UTM/meters	Florida US Survey Feet requirement is acceptable to USGS but not preferred.

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Vertical Datum	North American Vertical Datum of 1988 (NAVD88) units	The vertical datum for the supporting elevation data used to create the digital orthoimagery shall be North American Vertical Datum of 1988 (NAVD88) using the latest available National Geodetic Survey (NGS) control adjustment for the project area.	Florida requirement is in compliance with USGS requirement.
GPS and IMU	There is no specifically spelled out requirement for use of Airborne GPS and IMU to supplement ground control. It is discussed on the metadata template but not in the Base Digital Orthophoto Program Requirements.	Requires use of airborne GPS (ABGPS) and Inertial Measurement Units (IMU) over project area.	Recommend adding ABGPS and IMU language from USGS work order documents to Florida specification
Ground Control	Required to meet FGDC "Geospatial Positioning Accuracy Standards, Part 2: Standards for Geodetic Networks." A minimum of four published NAVD88 benchmarks shall be included in the control network to provide accurate elevations to a 10 centimeter positional accuracy standard.	Supplemental Ground Control with differentially corrected GPS or conventionally surveyed first-order ground control will be used to supplement the airborne GPS positional adjustment.	Florida requirement is in compliance with USGS requirement.

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Ground Control Reporting	A certified report of the Control Survey is required to be completed by the Professional Surveyor and Mapper (PSM) complain with 5J-17, F.A.C.	A published Supplemental Ground Control report that contains narrative, computations, and filed notes/photos for all points used in the supplemental ground control solution is required.	Florida appears to have more stringent requirements for reporting than USGS on this topic.
Ground Control Quality	Required to meet Minimum Technical Standards, Rule Chapter 5J-17, F.A.C. A minimum of 25 independent image checkpoints within the project area will be used for verification. Check points will be distributed throughout the dataset. Check points will be distributed so that points are spaced at intervals of at least ten (10) percent of the diagonal distance across the dataset and at least twenty (20) percent of the points are located in each quadrant of the dataset.	The contractor shall collect a minimum of an additional twenty (20) ground control points which will be used by the Government for validation. It is required that the control be sent directly to the government without being incorporated into the contractors production process.	It is assumed that the FL requirement for independent image checkpoints means that they will not be included in the production process. This point should be clarified to match the USGS language. The Florida requirement for 25 check points is more than required by USGS.
Base Stations		A minimum of two base station ground control points shall be used.	Florida does not specify the minimum number of ground control base stations.
Flight Diagram		A softcopy Flight Diagram which illustrates the project area outline, flight lines, image identification, and approximate location of image centers is required.	Florida does not specifically require submission of a GIS enabled flight diagram with flight lines, etc.

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Image Format	Imagery will be delivered as uncompressed GeoTIFF images with valid project header information. Requirement includes all tags required by USGS plus GeoAsciiParamsTag, GeoKeyDirectoryTag, and GTCitationGeoKey.	Uncompressed, untitled, ArcGIS readable, GeoTIFF file format with no internal tiling or overviews. GeoTiff files shall include the specific GeoTIFF tags and keys identified in standard and task order.	State requirements include additional GeoTIFF tags and are silent on compression issues.
Tile Naming	Tile naming convention is as follows:	For projects in UTM/meters, file names for the 1,500 x 1,500 m ortho image files shall be derived from the southwest corner of each image chip and shall be based on the U.S. National Grid. File names will include Grid Zone Designation (GZD), 100,000 meter block designator and X and Y grid coordinates truncated to 100 meters. Supplemental instructions for naming Digital Orthorectified Image files can be accessed at http://www.fgdc.gov/usng.	Tile naming conventions should be revisited to make sure that tiles are uniquely numbered, particularly when adjacent counties are flown in the same year under different projects.

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Tile Naming (*cont'd)*	YYYY__XXX_NNNNNN_BB_TTT._TIF Where: YYYY = Year in which last image was collected for the project. XXX = Three Digit County FIPS Code (See TABLE 1) NNNNNN = Appropriate tile (cell) number values found in the ProjectName_Ortho_Project_Area shapefile. Example: 2009_035_112345.tif (Flagler County)	For projects in State Plane/feet, file names for the 5,000 x 5,000 ft ortho image files shall be derived from the southwest corner of each image chip. The file name will consist of the X and Y state plane coordinate of the south-west corner, truncated to 1,000 feet.	The Florida standard include "_BB_TTT._TIF." The terms for BB and TTT are not explained..

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Building Lean	Consultant not expect to correct for "building lean" in urban areas.	Imagery shall be acquired at a density in the "high-rise" areas of urban areas such that all road networks are clearly visible and that building show no signs of excessive tilt or lean.	USGS requirements for building lean correction should be added to the Florida standard. The term "high-rise" is somewhat vague. Instead the standard should require correction of building lean in urban areas where the lean results in circumstances where the ability to identify transportation features is obscured.
Metadata Requirements			
	A metadata file must be delivered for each GeoTIFF image file, the DEM used for OrthoPhoto production, and the cutline feature class in an ArcCatalog compatible XML format. Templates for each deliverable that requires metadata are found in ATTACHMENT C – METADATA TEMPLATES. The templates are also available in an XML file delivered under separate cover.	Project metadata describing the orthophoto production process and each image file shall be submitted as a deliverable.	

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Metadata Requirements *(cont'd)*			
		Federal Geographic Data Committee (FGDC) compliant metadata shall be provided in extensible markup language (.xml) format for each orthorectified image file.	
	Metadata must be compliant with the Federal Geographic Data Committee's (FGDC) Content Standard for Spatial Metadata. All metadata must pass through the USGS metadata parser at http://geo-nsdi.er.usgs.gov/validation/ with no errors.	FGDC compliant metadata for orthoimage files shall be delivered on portable media	
	Metadata and the image collection date(s) must apply to each individual tile. The image Collection Date(s) field must be populated.		

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Orthophoto Deliverables			
Survey Reports	Detailed survey reporting requirements are identified in 5J, F.A.C.	A photography supplemental report shall show the flight line numbers and exposure stations or strip numbers. The contractor shall use the USGS Aerial Photography Supplemental Report form.	The Florida standard exceeds that of USGS. As a minimum standard codified in the F.A.C (Florida Administrative Code) this may be difficult to change. A careful evaluation of the additional cost versus the benefit of this additional reporting should be undertaken.
Digital Orthophoto Production			
Aerotriangulation Data	Referenced only in metadata section of standard.	Aerotriangulation data, if used in the orthorectification process, consisting of a minimum of refined plate coordinates, adjusted ground coordinates, and statistical summary report shall be submitted to the Government in both hardcopy and softcopy format.	Recommend modifying the Florida requirement to meet USGS standard.

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Quality Control			
Misalignment	The following text in included in the metadata example but not in the requirements as drafted: "Orthophotos are visually inspected for completeness to ensure that no gaps or image misplacements exist within and between adjacent images. These images are derived by mosaicking multiple images to ensure complete coverage of the project area."	Relative join (misalignment) of transportation features between adjacent images chips/tiles shall not exceed two (2) pixels. [One document spells out the relative join variation permitted at three (3) pixels.	The Florida specification should include specific language as the misalignment between features on adjacent tiles/chips.
Seamlines/Cutlines	Florida requires the submission of cutline data: "The Consultant will include a file "ProjectName_Cutlines" in ESRI Shape file format, containing a feature class of non-overlapping polygons with no data voids for the project area. Each polygon will delineate image capture dates used to seam together photographs for the production of orthophotography. "	Ground features such as building roof tops, water towers, and radio towers shall not be clipped at seamlines or between individual tiles.	The Florida specification is more detailed than USGS.

Item	FL Statewide Requirements (11/21/2011)	USGS Specification V3.1 (08/23/2010)	Comments
Buy-Up Options	The Consultant will deliver only the OrthoRectified color infrared and natural color imagery. Stereoscopic panchromatic imagery will be collected but not delivered unless specifically requested by the Agency.	Buy-up options are those specifications beyond the minimum requirements for one-foot orthoimagery. The cost of a buy-up option is based on the increased level of effort over the cost for baseline imagery. The following are considered buy-up options: -color-infrared -panchromatic -four-band -increased footprint -better horizontal accuracy -increased resolution (ex. – 6-in) reduced resolution (requires resampling) better elevation resolution	USGS anticipates the need for a wide variety of "buy-up" options. The Florida specifications are largely silent on the topic.

Appendix C: Review of Statutes and Codes

Departments with Mapping Responsibilities or Requirements

Department of Transportation

The Department of Transportation is empowered under Title IV, Executive Branch, Chapter 20 or the Florida Statues as an executive branch agency led by a Secretary appointed by the Governor. In addition to the Secretary there is a nine member Florida Transportation Commission responsible for recommending major transportation policies, review of the status of the transportation system, in-depth evaluation of the Department's annual budget, monitoring finances status of the Department, and a variety of other oversight functions on Departmental operations.

The mission of the Department, as identified in 334.046, is to provide a safe statewide transportation system that ensures the mobility of people and goods, enhances economic prosperity, and preserves the quality of our environment and communities. The guiding principles of the Department are to:

- Protect the state's transportation infrastructure investment
- Ensure that the state has a clear understanding of the economic consequences of transportation investments, and how such investments affect the state's economic competitiveness.
- Ensure a cost-effective, statewide, interconnected transportation system.

The Department of Transportation does have an explicit legislative mandate to develop topographic maps. A topographic map is a detailed and accurate graphic representation of cultural (man-made) and natural features on the ground. The Department is required, under 334.24, to collect data and information as to all roads in the state and, when practicable, have maps and plats thereof made. Orthophotography mapping is one of the current best practice science being used by the Department to collect this information.

There is also an implied requirement for imagery in support of planning, engineering, and operational functions necessary to preserve the State's transportation network and to ensure that transportation facilities are sufficient to support Florida's the economic competitiveness.

Department of Revenue

The Department of Revenue, created under Chapter 20, is an executive branch agency with the following responsibilities:

- **ad valorem tax responsibilities** to carry out the relevant provisions of ad valorem tax law. Ad valorem tax functions include, but are not limited to, ad valorem administration, assessment standards and review, central property valuation, and field operations.
- **audit responsibilities** of the department are to plan, organize, administer, and control tax auditing activities.
- **collection and enforcement responsibilities** to conduct tax collection and enforcement activities. Collection and enforcement functions include, but are not limited to, investigative services and central and field operations.
- **information systems and services responsibilities** to develop, maintain, and manage all information systems for tax return processing and taxpayer registration activities. Information systems and services functions include, but are not limited to, automation of all information systems.

The Department of Revenue is charged under legislation and code with providing regulations to make available maps and mapping materials as it deems necessary to ensure that all real property in the state is listed and valued on real property assessment rolls of the counties (F.S. 193.085). The administrative regulations promulgated under this legislation require all property appraisers to maintain aerial photography suitable for the needs of his office (F.A.C. 12D-1.009). Requirements for maintaining an adequate cadastral mapping program to meet his requirement can be found in the Department of Revenue's Manual of Instructions.

The Department is required by 195.022 to, "Upon request of any property appraiser or, in any event, at least once every 3 years, the department shall prescribe and furnish such aerial photographs and nonproperty ownership maps to the property appraisers as necessary to ensure that all real property within the state is properly listed on the roll. All photographs and maps furnished to counties with a population of 25,000 or fewer shall be paid for by the department as provided by law. For counties with a population greater than 25,000, the department shall furnish such items at the property appraiser's expense. The department may incur reasonable expenses for procuring aerial photographs and nonproperty ownership maps and may charge a fee to the respective property appraiser equal to the cost incurred."

Department of Environmental Protection

The Department of Environmental Protection (DEP) is an executive branch agency charged with regulatory matters of waste management, water resource management, wetlands, and air resources. They are the lead agency for environmental management and stewardship. DEP's Division of State Lands acquires and manages lands and currently provides oversight for approximately 12 million acres

of public lands. The Department is also responsible for the Florida State Park System and management of 160 parks covering 700,000 acres and 100 miles of beach.

Under the provisions of the "Florida Water Resources Act of 1972" the Department is required to "Conduct, independently or in cooperation with other agencies, topographic surveys, research, and investigations into all aspects of water use and water quality." While there appears to be nothing explicit in the statues requiring the Department to maintain and fund mapping programs there are no fewer than 38 Florida Administrative Code regulations requiring submission of permit applications with a map including an aerial photo. These requirements are detailed in Table 2 of this document.

The Department does have the authority to serve as the central repository for all scientific and factual information generated by local governments, water management districts, and state agencies related to water resources. The Department is authorized to prescribe the format and ensure quality control for all data submitted.

The statute also encourages the Department of Environmental Protection to work through interagency or interlocal agreements with other state agencies, water management districts, and local governments when conducting programs related or materially affection water resources.

Water Management Districts

The five Water Management Districts were created under F.S. 373.069 and given the power to develop overall basin plans. The planning should assist organizations in meeting water supply needs in such a manner as will give priority to encouraging conservation and reduction adverse environmental effect of improper or excessive withdrawals of water.

The water management districts are required under F.S. 373.145 to develop information programs to aid in the development of a better understanding of surface and groundwater resources and to develop efficient means to distribute this information. These information programs include a combination of ecologic, geospatial, geohydrologic, hydrologic and water quality data collection activities. Orthophotos are a key component of the water management districts' hydrologic conditioning and consumption programs since they allow accurate delineation of surface water features, support evaluation of impacts of groundwater withdrawals on surface water feature and wetlands, assist in precise geolocation of hydrologic and water quality sampling stations, and provide the base data for monitoring land use changes and their impact on water resources. However, there is no specific statutory reference to aerial image acquisition or processing.

Fish and Wildlife Conservation Commission

The Fish and Wildlife Conservation Commission is established by F.S. 379.102 and has responsibilities associated with management of hunting and fishing resources. The Commission administers a host of trust funds and programs associated with conservation of these resources.

The management and monitoring of habitat requires adequate spatial data but there appears to be no specific legislative mandate for the Commission to maintain an aerial imagery program.

Consultants' Competitive Negotiation Act

All services for surveying and mapping in Florida are required to be procured under F.S. 287, the "Consultants' Competitive Negotiation Act." This act requires the professional services, including those from a registered surveyor and mapper, be based on an open evaluation of a statement of professional qualifications and performance data on file. Three firms are required to be selected and ranked prior to procurement of any professional service.

Following the selection and ranking of three firms, negotiations begin with the intension of determining compensation for services that is fair, competitive, and reasonable relative to the complexity and scope of the project. If negotiations cannot be satisfactorily concluded with the highest ranked firm the negotiations must be formally terminated and then initiated with the next highest ranked firm.

Aerial imagery is considered under statute to be a professional service so this is the only legal method for procurement of mapping services.

Review of Relevant Laws

The table below summarized the Florida Statutes that related to aerial imagery programs.

Table 1. Summary of Florida Laws Related to Aerial Imagery Programs and Requirements

Title		Chapter		Section		Text
XXVII	Natural Resources; Conservation, Reclamation, and Use	373	Water Resources	373.026	General powers and duties of the department	The department, or its successor agency, shall be responsible for the administration of this chapter at the state level. However, it is the policy of the state that, to the greatest extent possible, the department may enter into interagency or interlocal agreements with any other state agency, any water management district, or any local government conducting programs related to or materially affecting the water resources of the state. All such agreements shall be subject to the provisions of s. 373.046. In addition to its other powers and duties, the department shall, to the greatest extent possible: (1) Conduct, independently or in cooperation with other agencies, topographic surveys, research, and investigations into all aspects of water use and water quality. (2) Be the central repository for all scientific and factual information generated by local governments, water management districts, and state agencies relating to water resources and, to that end, collect, maintain, and make available such information to public and private users within the state and assist in the acquisition of scientific and factual data from water management districts, local governments, and the United States Geological Survey. All local governments, water management districts, and state agencies are directed to cooperate with the department or its agents in making available to it for this purpose such scientific and factual data as they may have, generate, or possess, as the department deems necessary. The department is authorized to prescribe the format and ensure quality control for all data collected or submitted. (a) Additionally, the department shall annually publish a bibliography of all water resource investigations conducted in the state. (b) The department is additionally directed to establish priorities for the development of a computerized groundwater database upon the following principles:

Title		Chapter		Section		Text
						1. Regions deemed prone to groundwater contamination due to land use. 2. Regions that have an identifiable direct connection with any confined aquifer utilized as a drinking water aquifer. 3. Any region dependent on a single-source aquifer. (3) Cooperate with other state agencies, water management districts, and regional, county, or other local governmental organizations or agencies created for the purpose of utilizing and conserving the waters in this state; assist such organizations and agencies in coordinating the use of their facilities; and participate in an exchange of ideas, knowledge, and data with such organizations and agencies. For this purpose, the department may maintain an advisory staff of experts. (4) Prepare and provide for dissemination to the public of current and useful information relating to the water resources of the state. (5) Identify by continuing study those areas of the state where saltwater intrusion is a threat to freshwater resources and report its findings to the water management districts, boards of county commissioners, and public concerned. (6) Conduct, either independently or in cooperation with any person or governmental agency, a program of study, research, and experimentation and evaluation in the field of weather modification. (7) Exercise general supervisory authority over all water management districts. The department may exercise any power herein authorized to be exercised by a water management district. (8)(a) Provide such coordination, cooperation, or approval necessary to the effectuation of any plan or project of the Federal Government in connection with or concerning the waters in the state. Unless otherwise provided by state or federal law, the department shall, subject to confirmation by the Legislature, have the power to approve or disapprove such federal plans or projects on behalf of the state. If such plan or project is for a coastal inlet, the department shall first determine the impact of the plan or project on the sandy beaches in the state. If the department determines that the plan will have a significant adverse impact on the sandy beaches, the department may

Title		Chapter		Section		Text
						not approve the plan or project unless it is revised to mitigate those impacts.
XXVII	Natural Resources; Conservation, Reclamation, and Use	373	Water Resources	373.069	Creation of water management districts	(1) At 11:59 p.m. on December 31, 1976, the state shall be divided into the following water management districts: (a) Northwest florida water management district. (b) Suwannee River water management district. (c) St. Johns River water management district. (d) Southwest florida water management district. (e) South florida water management district.
XXVII	Natural Resources; Conservation, Reclamation, and Use	373	Water Resources	373.703	Water production; general powers and duties	In the performance of, and in conjunction with, its other powers and duties, the governing board of a water management district existing pursuant to this chapter: (1) Shall engage in planning to assist counties, municipalities, special districts, publicly owned and privately owned water utilities, multijurisdictional water supply entities, or regional water supply authorities in meeting water supply needs in such manner as will give priority to encouraging conservation and reducing adverse environmental effects of improper or excessive withdrawals of water from concentrated areas. As used in this section and s. 373.707, regional water supply authorities are regional water authorities created under s. 373.713 or other laws of this state. (2) Shall assist counties, municipalities, special districts, publicly owned or privately owned water utilities, multijurisdictional water supply entities, or regional water supply authorities in meeting water supply needs in such manner as will give priority to encouraging conservation and reducing adverse environmental effects of improper or excessive withdrawals of water from concentrated areas. (3) May establish, design, construct, operate, and maintain water production and transmission facilities for the purpose of supplying water to counties, municipalities, special districts, publicly owned and privately owned water utilities, multijurisdictional water supply entities, or regional water supply

Title		Chapter		Section		Text
						authorities. The permit required by part II of this chapter for a water management district engaged in water production and transmission shall be granted, denied, or granted with conditions by the department. (9) May join with one or more other water management districts, counties, municipalities, special districts, publicly owned or privately owned water utilities, multijurisdictional water supply entities, or regional water supply authorities for the purpose of carrying out any of its powers, and may contract with such other entities to finance acquisitions, construction, operation, and maintenance. The contract may provide for contributions to be made by each party thereto, for the division and apportionment of the expenses of acquisitions, construction, operation, and maintenance, and for the division and apportionment of the benefits, services, and products therefrom. The contracts may contain other covenants and agreements necessary and appropriate to accomplish their purposes
XXVII	Natural Resources; Conservation, Reclamation, and Use	373	Water Resources	379.102	Fish and Wildlife Conservation Commission	(1) The Fish and Wildlife Conservation Commission shall consist of seven members who shall be appointed by the Governor, subject to confirmation by the Senate, for staggered terms of 5 years. (2) Members so appointed shall annually select one of their members as chair. Such chair may be removed at any time for sufficient cause, by the affirmative vote of the majority of the members of the commission. In case the said office of chair becomes vacant by removal or otherwise, the same may be filled for the unexpired term at any time by the commission from its members. (3) Commission members shall receive no compensation for their services as such, but shall be reimbursed for travel expenses as provided in s. 112.061.

Title		Chapter		Section		Text
XXVII	Natural Resources; Conservation, Reclamation, and Use	373	Water Resources	373.083	General powers and duties of the governing board	(3) Make surveys and investigations of the water supply and resources of the district and cooperate with other governmental agencies in similar activities.
IV	Executive Branch	20	Organizational Structure	20.225	Department of Environmental Protection	There is created a Department of Environmental Protection. (1) The head of the Department of Environmental Protection shall be a secretary, who shall be appointed by the Governor, with the concurrence of three or more members of the Cabinet. The secretary shall be confirmed by the Florida Senate. The secretary shall serve at the pleasure of the Governor. (2)(a) There shall be three deputy secretaries who are to be appointed by and shall serve at the pleasure of the secretary. The secretary may assign any deputy secretary the responsibility to supervise, coordinate, and formulate policy for any division, office, or district. The following special offices are established and headed by managers, each of whom is to be appointed by and serve at the pleasure of the secretary: 1. Office of Chief of Staff; 2. Office of General Counsel; 3. Office of Inspector General; 4. Office of External Affairs; 5. Office of Legislative Affairs; 6. Office of Intergovernmental Programs; and 7. Office of Greenways and Trails. (b) There shall be six administrative districts involved in regulatory matters of waste management, water resource management, wetlands, and air resources, which shall be headed by managers, each of whom is to be appointed by and serve at the pleasure of the secretary. Divisions of the department may have one assistant or two deputy division directors, as required to facilitate effective operation. The managers of all divisions and offices specifically named in this section and the directors of the six administrative districts are exempt from part II of chapter 110 and are included in the Senior Management Service in accordance with s. 110.205(2)(j). (3) The following divisions of the Department of Environmental Protection

Title		Chapter		Section		Text
						are established: (a) Division of Administrative Services. (b) Division of Air Resource Management. (c) Division of Water Resource Management. (d) Division of Law Enforcement. (e) Division of Environmental Assessment and Restoration. (f) Division of Waste Management. (g) Division of Recreation and Parks. (h) Division of State Lands, the director of which is to be appointed by the secretary of the department, subject to confirmation by the Governor and Cabinet sitting as the Board of Trustees of the Internal Improvement Trust Fund. (8) The department is the agency of state government responsible for collecting and analyzing information concerning energy resources in this state; for coordinating the energy conservation programs of state agencies; and for coordinating the development, review, and implementation of the state's energy policy.
XXVI	Public Transportation	334	Transportation Administration	334.24	Compilation, maintenance, and provision of information relating to road building and repair.	The department shall: (1) Collect data and information as to all roads in the state and, when practicable, have maps and plats thereof made. (2) Investigate and collect data and information as to the best methods and materials for road building and repair. (3) Investigate and gather information as to road building and repair in the different localities in the state. (4) Compile all such data and information and furnish it to counties upon request.

Title		Chapter		Section		Text
		334	Transportation Administration	334.046	Department mission, goals, and objectives	(5) Keep on file at the department headquarters copies of such data and information as a public record. (1) The prevailing principles to be considered in planning and developing an integrated, balanced statewide transportation system are: preserving the existing transportation infrastructure; enhancing Florida's economic competitiveness; and improving travel choices to ensure mobility. (2) The mission of the Department of Transportation shall be to provide a safe statewide transportation system that ensures the mobility of people and goods, enhances economic prosperity, and preserves the quality of our environment and communities. (3) The department shall document in the Florida Transportation Plan, in accordance with s. 339.155 and based upon the prevailing principles of preserving the existing transportation infrastructure, enhancing Florida's economic competitiveness, and improving travel choices to ensure mobility, the goals and objectives that provide statewide policy guidance for accomplishing the department's mission. (4) At a minimum, the department's goals shall address the following prevailing principles. (a) Preservation.—Protecting the state's transportation infrastructure investment. Preservation includes: 1. Ensuring that 80 percent of the pavement on the State Highway System meets department standards; 2. Ensuring that 90 percent of department-maintained bridges meet department standards; and 3. Ensuring that the department achieves 100 percent of the acceptable maintenance standard on the state highway system. (b) Economic competitiveness.—Ensuring that the state has a clear understanding of the economic consequences of transportation investments, and how such investments affect the state's economic competitiveness. The department must develop a macroeconomic analysis of the linkages between transportation investment and economic performance, as well as a method to quantifiably measure the economic benefits of the district-work-program investments. Such an analysis must analyze: 1. The state's and district's economic performance relative to

Title		Chapter		Section		Text
						the competition. 2. The business environment as viewed from the perspective of companies evaluating the state as a place in which to do business. 3. The state's capacity to sustain long-term growth. (c) Mobility.—Ensuring a cost-effective, statewide, interconnected transportation system.
XXXII	Regulation of Professions and Occupations	472	Land Surveying and Mapping	472.005	Definitions	1) "Board" means the Board of Professional Surveyors and Mappers. (2) "Department" means the Department of Agriculture and Consumer Services. (3) "Surveyor and mapper" includes the term "professional surveyor and mapper" and means a person who is registered to engage in the practice of surveying and mapping under ss. 472.001-472.037. For the purposes of this statute, a surveyor and mapper means a person who determines and displays the facts of size, shape, topography, tidal datum planes, legal or geodetic location or relation, and orientation of improved or unimproved real property through direct measurement or from certifiable measurement through accepted photogrammetric procedures. (4)(a) "Practice of surveying and mapping" means, among other things, any professional service or work, the adequate performance of which involves the application of special knowledge of the principles of mathematics, the related physical and applied sciences, and the relevant requirements of law for adequate evidence of the act of measuring, locating, establishing, or reestablishing lines, angles, elevations, natural and manmade features in the air, on the surface and immediate subsurface of the earth, within underground workings, and on the beds or surface of bodies of water, for the purpose of determining, establishing, describing, displaying, or interpreting the facts of size, shape, topography, tidal datum planes, legal or geodetic location or relocation, and orientation of improved or unimproved real property and appurtenances thereto, including acreage and condominiums. (b) The practice of surveying and mapping also includes, but is not limited to, photogrammetric control; the monumentation and remonumentation of property boundaries and subdivisions; the measurement of and preparation of plans showing existing improvements after construction; the layout of

Title		Chapter		Section		Text
						proposed improvements; the preparation of descriptions for use in legal instruments of conveyance of real property and property rights; the preparation of subdivision planning maps and record plats, as provided for in chapter 177; the determination of, but not the design of, grades and elevations of roads and land in connection with subdivisions or divisions of land; and the creation and perpetuation of alignments related to maps, record plats, field note records, reports, property descriptions, and plans and drawings that represent them. (7) The term "license" means the registration of surveyors and mappers or the certification of businesses to practice surveying and mapping in this state. (8) "Photogrammetrist" means any person who engages in the practice of surveying and mapping using aerial or terrestrial photography or other sources of images
XXIX	Public Health	403	Environmental Control	403.5112	Filing of notice of certified corridor route	403.5112 Filing of notice of certified corridor route.— (1) Within 60 days after certification of an associated linear facility pursuant to this act, the applicant shall file, in accordance with s. 28.222, with the department and the clerk of the circuit court for each county through which the corridor will pass, a notice of the certified route. (2) The notice shall consist of maps or aerial photographs in the scale of 1:24,000 which clearly show the location of the certified route and shall state that the certification of the corridor will result in the acquisition of rights-of-way within the corridor. Each clerk shall record the filing in the official record of the county for the duration of the certification or until such time as the applicant certifies to the department and the clerk that all lands required for the transmission line rights-of-way within the corridor have been acquired within such county, whichever is sooner. NOTE: Electrical and Power Plan Transmission Line Siting
XXVIII	Natural Resources; Conservation, Reclamation, and Use	378	Land Reclamation	378.203	Definitions	(1) "Acres mined" means all acres on which mining operations have resulted in extraction of phosphate rock. (2) "Annual report" means a detailed report, including maps and aerial photographs, submitted for each mine, which describes and delineates mining operations and reclamation or restoration activities undertaken in the previous calendar year.

Title		Chapter		Section		Text
XVIII	Public Lands and Property	253	State Lands	253.12	Title to tidal lands vested in state	(9) All of the state's right, title, and interest to all tidally influenced land or tidally influenced islands bordering or being on sovereignty land, which have been permanently extended, filled, added to existing lands, or created before July 1, 1975, by fill, and might be owned by the state, is hereby granted to the landowner having record or other title to all or a portion thereof or to the lands immediately upland thereof and its successors in interest. Thereafter, such lands shall be considered private property, and the state, its political subdivisions, agencies, and all persons claiming by, through, or under any of them, shall be barred from asserting that any such lands are publicly owned sovereignty lands. The foregoing provisions shall act to transfer title only to so much of such extended or added land as was permanently exposed, extended, or added to before July 1, 1975. A showing of dates by which certain lands were filled or added to may be made by aerial photograph or other reasonable method. Upon request of the landowner and submission of a proposed legal description and aerial photographs or other evidence accompanied by a fee set by the board reflecting the actual administrative cost of processing, the board shall provide an appropriate legal description of the waterward boundary line as of July 1, 1975, in a recordable document. The Legislature specifically finds and declares these grants to be in the public interest. The boundary between state-owned sovereignty lands and privately owned uplands is ambulatory and will move as a result of nonavulsive changes. This subsection shall not grant or vest title to any filled, formerly submerged state-owned lands in any person who, as of January 1, 1993, is the record titleholder of the filled or adjacent upland property and who filled or caused to be filled the state-owned lands.
XXXV	Agriculture, Horticulture, and Animal Industry	601	Florida Citrus Code	601.28	Inspection fees	2. The amount, if any, by which the costs actually incurred with respect to the foregoing during the preceding shipping season may have exceeded the fees collected under this paragraph during that season, or less the amount, if any, by which the fees collected under this paragraph during the preceding shipping season may have exceeded the costs actually incurred with respect to the foregoing during that season. (2)(a) Costs and income required to be prorated under the terms of paragraphs (a), (b), and (c) of subsection (1) shall be prorated on the basis of the number of boxes on which fees were assessed under the particular paragraph as compared to the total number of boxes of citrus fruit delivered

Title		Chapter		Section		Text
						into the primary channel of trade during the particular shipping season. Expenditures of funds for estimation of the size of the citrus crop in Florida by the Department of Agriculture through its cooperative agreement with the United States Department of Agriculture shall be for service and research work related to estimating and forecasting citrus production in Florida, including, but not limited to, tree counts, using aerial photography and ground surveys, fruit counts, fruit measurement, maturity and yield surveys, damage surveys, opinion surveys, season average price determinations, and related activities.
XXIX	Public Health	403	Environmental Controls	403.9417	Recording of Notice of certified corridor route	Recording of notice of certified corridor route.—Within 60 days after certification of a natural gas transmission pipeline corridor pursuant to ss. 403.9401-403.9425, the applicant shall file, in accordance with s. 28.222, with the clerk of the circuit court for each county through which the corridor will pass, a notice of the certified route. The notice shall consist of maps or aerial photographs in the scale of 1:24,000 which clearly show the location of the certified route and shall state that the certification of the corridor will result in the acquisition of rights-of-way within the corridor. Each clerk shall record the filing in the official record of the county for the duration of the certification or until such time as the applicant certifies to the clerk that all lands required for the natural gas transmission pipeline rights-of-way within the corridor have been acquired within such county, whichever is sooner. The recording of this notice shall not constitute a lien, cloud, or encumbrance on real property.
XXIX	Public Health	403	Environmental Controls	403.5312	Filing of notice of certified corridor route	(1) Within 60 days after certification of a transmission line corridor under ss. 403.52-403.5365, the applicant shall file with the department and, in accordance with s. 28.222, with the clerk of the circuit court for each county through which the corridor will pass, a notice of the certified route. (2) The notice must consist of maps or aerial photographs in the scale of 1:24,000 which clearly show the location of the certified route and must state that the certification of the corridor will result in the acquisition of rights-of-way within the corridor. Each clerk shall record the filing in the official record of the county for the duration of the certification or until such time as the applicant certifies to the department and the clerk that all lands required for

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						the transmission line rights-of-way within the corridor have been acquired within the county, whichever is sooner.
XXVII	Natural Resources; Conservation, Reclamation, and Use	378	Land Reclamation	378.403	Definitions	(2) "Annual report" means a detailed report, including maps and aerial photographs, submitted for each mine, which describes and delineates mining operations and reclamation or restoration activities undertaken in the previous calendar year.
XXVII	Natural Resources; Conservation, Reclamation, and Use	376	Pollutant Discharge Prevention and Removal	376.121	Liability for damage to natural resources	The Legislature finds that extensive damage to the state's natural resources is the likely result of a pollutant discharge and that it is essential that the state adequately assess and recover the cost of such damage from responsible parties. It is the state's goal to recover the costs of restoration from the responsible parties and to restore damaged natural resources to their predischarge condition. In many instances, however, restoration is not technically feasible. In such instances, the state has the responsibility to its citizens to recover the cost of all damage to natural resources 4. Habitat factor: The amount of compensation for damage to the natural resources of the state is established as follows: a. $10 per square foot of coral reef impacted. b. $1 per square foot of mangrove or seagrass impacted. c. $1 per linear foot of sandy beach impacted. d. $0.50 per square foot of live bottom, oyster reefs, worm rock, perennial algae, saltmarsh, or freshwater tidal marsh impacted. e. $0.05 per square foot of sand bottom or mud flats, or combination thereof, impacted. (b) The areal and linear coverage of habitat impacted shall be determined by the department using a combination of field measurements, aerial photogrammetry, and satellite imagery. An area is impacted when the pollutant comes in contact with the habitat. 10) Rule 17-340.300(3), Florida Administrative Code, is added to read:

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XXVII	Natural Resources; Conservation, Reclamation, and Use	373	Water Resources	373.4211	Ratification of chapter 17-340. F.A.C.	"(3)(a) If the vegetation or soils of an upland or wetland area have been altered by natural or human-induced factors such that the boundary between wetlands and uplands cannot be delineated reliably by use of the methodology in subsection 17-340.300(2), F.A.C., as determined by the regulating agency, and the area has hydric soils or riverwash, as identified using standard U.S.D.A.-S.C.S. practices for Florida, including the approved hydric soil indicators, except where the hydric soil is disturbed by a nonhydrologic mechanical mixing of the upper soil profile and the regulating agency establishes through data or evidence that hydric soil indicators would be present but for the disturbance, then the most reliable available information shall be used with reasonable scientific judgment to determine where the methodology in subsection 17-340.300(2), F.A.C., would have delineated the boundary between wetlands and uplands. Reliable available information may include, but is not limited to, aerial photographs, remaining vegetation, authoritative site-specific documents, or topographical consistencies.
XXVII	Natural Resources; Conservation, Reclamation, and Use	373	Water Resources	373.421	Delineation methods; formal determinations	(6) The district or the department may also issue nonbinding informal determinations or otherwise institute determinations on its own initiative as provided by law. A nonbinding informal determination of the extent of surface waters and wetlands issued by the South Florida Water Management District or the Southwest Florida Water Management District, between July 1, 1989, and the effective date of the methodology ratified in s. 373.4211, shall be validated by the district if a petition to validate the nonbinding informal determination is filed with the district on or before October 1, 1994, provided: (c) Any supplemental information, such as aerial photographs and soils maps, is provided as necessary to ensure an accurate determination;
XVI	Taxation and Finance	195	Property Assessment Administration and Finance	195.087	Property appraisers and tax collectors to submit budget to Dept. of Revenue	(4) The property appraisers and tax collectors of this state are hereby authorized to pay any fee established by the department for attendance by an employee at a school established and conducted by the department pursuant to s. 195.002. Further, the travel and per diem expenses of such employee may be paid as set forth in s. 112.061. Property appraisers are authorized to pay a fee established by the department for the costs of aerial photographs and nonproperty ownership maps provided by the department pursuant to s. 195.022.

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X	Public Officers, Employees, and Records	119	Public Records	119.07	Inspection and copying of records photographing public records; fees; exemptions.	3. For all other copies, the actual cost of duplication of the public record. (b) The charge for copies of county maps or aerial photographs supplied by county constitutional officers may also include a reasonable charge for the labor and overhead associated with their duplication.
XXVIII	Natural Resources; Conservation, Reclamation, and Use	373	Water Resources	373.012	Topographic Mapping	(1) In order to accelerate topographic mapping in this state by the United States Geological Survey, the Department of Transportation is hereby authorized and directed to set aside, to pledge, and to make available annually out of its State Transportation Trust Fund the sum of $30,000; and the Board of Trustees of the Internal Improvement Trust Fund is hereby authorized and directed to set aside, to pledge and to make available annually out of the Land Acquisition Trust Fund the sum of $10,000; and the South Florida Water Management District out of its funds to be derived out of the proceeds of special assessments of its flood control taxes, is authorized and directed to set aside, to pledge and to make available annually such sum as may be required to meet the needs for topographic mapping of areas affecting said district. Such sums shall be delivered to the Treasurer of the United States or to other proper officer, to be applied by the Department of the Interior, United States Geological Survey, as to said Department of Transportation and to said Board of Trustees of the Internal Improvement Trust Fund, toward the payment of not exceeding one-half the cost of standard topographic mapping in this state conducted by the United States Geological Survey and as to said flood control district to be applied toward the payment of such proportion or part of such cost as said district may determine. Provided, however, that said sums authorized in this section for the Department of Transportation and for the Board of Trustees of the Internal Improvement Trust Fund shall not prevent either of said agencies from providing additional amounts for topographic mapping of areas which either agency may consider of priority status in the interest of said agencies. (2) To further accelerate the rate at which topographic mapping may be carried on in Florida, any state agency having funds available for the purpose, any county or drainage or reclamation or flood control district organized under the laws of this state, any person, firm or corporation, is authorized to contribute to the cost of such mapping by depositing with the Department of Transportation such amounts as may be determined to be applied in like

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						manner toward topographic mapping in this state as set forth in subsection (1). (3) The Department of Transportation, the Board of Trustees of the Internal Improvement Trust Fund of this state, and the South Florida Water Management District are hereby authorized to make such arrangements or enter into such agreements with the United States as may be necessary to carry out the purposes of this section. (4) The Board of Trustees of the Internal Improvement Trust Fund, as and when copies of topographic maps are made available to it, shall file such maps in the same manner as other maps and plats of land surveys by the United States, and the maps shall be available for examination by any interested person.
XXXV	Agriculture, Horticulture, and Animal Industry	604	General Agricultural Laws	604.01	Statewide soil survey and mapping; declaration of policy	A thorough and careful survey and mapping of the soils of Florida is hereby declared as a matter of legislative policy, basic to: (1) The development of intelligent research programs on the agricultural potentialities of the soils of the state; (2) The organization of effective soil conservation and land use planning programs; (3) Agricultural extension and home demonstration work; (4) Highway and secondary road planning; (5) Establishment of equitable land tax assessments; (6) Agricultural teaching; (7) The development of a sound body of helpful agricultural information for nationwide distribution to prospective landowners; and (8) A number of other social and agricultural enterprises of broad public interest.
XXXV	Agriculture, Horticulture, and Animal Industry	604	General Agricultural Laws	604.006	Mapping and monitoring of agricultural lands	(1) It is the intent of the Legislature that current and continuously updated information on the state's agricultural land base be available to all governmental bodies in the state, so that it may be established whether a net decline in the amount of available agricultural land is occurring. (2) The Department of Economic Opportunity shall develop a program for mapping and monitoring the agricultural lands in the state. The department has the power to adopt rules necessary to carry out the purposes of this section, and it may contract with other agencies for the provision of necessary

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						mapping and information services. (3) In compiling the information specified in this section, the department shall utilize to the fullest extent practicable the topographical data available through the LANDSAT satellite program of the Department of Transportation; soils data developed through the county soil survey and land evaluation and site assessment (LESA) programs of the Soil Conservation Service; the agricultural land use statistics required to be furnished annually to the Department of Revenue by the various county property appraisers; data compiled through the federal censuses of agriculture; crop data and other data collected and maintained by the Department of Agriculture and Consumer Services and the United States Department of Agriculture; and relevant data developed or maintained by the Institute of Food and Agricultural Sciences and other components of the State University System. Each of these agencies of state government and all other state agencies, as well as local and regional governmental agencies, shall cooperate with the department in establishing the mapping and monitoring program provided for in this section.
XIX	Public Business	287	Procurement of Personal Property and Services	287.005	Acquisition of professional architectural, engineering, landscape architectural, or surveying and mapping services…	(1) SHORT TITLE.—This section shall be known as the "Consultants' Competitive Negotiation Act." (2) DEFINITIONS.—For purposes of this section: (a) "Professional services" means those services within the scope of the practice of architecture, professional engineering, landscape architecture, or registered surveying and mapping, as defined by the laws of the state, or those performed by any architect, professional engineer, landscape architect, or registered surveyor and mapper in connection with his or her professional employment or practice.
XII	Municipalities	177	Land Boundaries	177.27	Definitions Powers of the	(7) "Department" means the Department of Environmental Protection. (2) In addition to such powers as may be specifically delegated to it under

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			Florida Coastal Mapping Act of 1974	177.29	Department	the provisions of this part, the department is authorized to perform the following functions: (a) To coordinate the efforts of all public and private agencies and organizations engaged in the making of tidal surveys and maps of the coastal areas of this state, with the object of avoiding unnecessary duplication and overlapping; (b) To serve as a coordinating state agency for any program of tidal surveying and mapping conducted by the Federal Government; (c) To assist any court, tribunal, administrative agency, or political subdivision, and to make available to them information, regarding tidal surveying and coastal boundary determinations; (d) To contract with federal, state, or local agencies or with private parties for the performance of any surveys, studies, investigations, or mapping activities, for preparation and publication of the results thereof, or for other authorized functions relating to the objectives of this part; (e) To develop permanent records of tidal surveys and maps of the state's coastal areas; (f) To develop uniform specifications and regulations for tidal surveying and mapping coastal areas of the state; (g) To collect and preserve appropriate survey data from coastal areas; and (h) To act as a public repository for copies of coastal area maps and to establish a library of such maps and charts.
XVII	Public Lands and Property	270	Public Lands	270.22	Proceeds of state lands to go into Internal Improvement Trust Fund	(2) Rental fees for aquaculture leases pursuant to s. 253.71(2) shall be deposited into the General Inspection Trust Fund of the Department of Agriculture and Consumer Services. Such fees generated by shellfish-related aquaculture leases shall be used for shellfish-related aquaculture activities, including research, lease compliance inspections, mapping, and siting.
XXVII	Railroads and other regulated utilities	365	Use of Telephones and Facsimile Machines	365.172	Emergency Communications number "E911"	(9) AUTHORIZED EXPENDITURES OF E911 FEE.— (a) For purposes of this section, E911 service includes the functions of database management, call taking, dispatching, location verification, and call transfer.

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						(b) All costs directly attributable to the establishment or provision of E911 service and contracting for E911 services are eligible for expenditure of moneys derived from imposition of the fee authorized by this section. These costs include the acquisition, implementation, and maintenance of Public Safety Answering Point (PSAP) equipment and E911 service features, as defined in the Public Service Commission's lawfully approved 911 and E911 and related tariffs or the acquisition, installation, and maintenance of other E911 equipment, including call answering equipment, call transfer equipment, ANI controllers, ALI controllers, ANI displays, ALI displays, station instruments, E911 telecommunications systems, visual call information and storage devices, recording equipment, telephone devices and other equipment for the hearing impaired used in the E911 system, PSAP backup power systems, consoles, automatic call distributors, and interfaces, including hardware and software, for computer-aided dispatch (CAD) systems, integrated CAD systems for that portion of the systems used for E911 call taking, network clocks, salary and associated expenses for E911 call takers for that portion of their time spent taking and transferring E911 calls, salary and associated expenses for a county to employ a full-time equivalent E911 coordinator position and a full-time equivalent mapping or geographical data position and a staff assistant position per county for the portion of their time spent administrating the E911 system, training costs for PSAP call takers, supervisors, and managers in the proper methods and techniques used in taking and transferring E911 calls, costs to train and educate PSAP employees regarding E911 service or E911 equipment, including fees collected by the Department of Health for the certification and recertification of 911 public safety telecommunicators as required under s. 401.465, and expenses required to develop and maintain all information, including ALI and ANI databases and other information source repositories, necessary to properly inform call takers as to location address, type of emergency, and other information directly relevant to the E911 call-taking and

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						transferring function. Moneys derived from the fee may also be used for next-generation E911 network services, next-generation E911 database services, next-generation E911 equipment, and wireless E911 routing systems.
XIX	Public Business	282	Communication and Data Processing	282.201	State data center system; agency duties and limitations	(c) During the 2011-2012 fiscal year, the following shall be consolidated into the Southwood Shared Resource Center: 3. By March 31, 2012, the Department of Transportation's Survey & mapping Office.
XVII	Public Lands and Properties	272	Capitol Center	272.121	Capitol Center long-range planning	(5) The department [Department of Mangement Services] is authorized to contract with the City of Tallahassee, Leon County, the Tallahassee-Leon County Planning Department, or any other agency of such city or county to obtain planning services and functions required for the planning and development of the district in harmony with the coordinated planning of the city and the county. Services and functions covered under such agreements may include, but shall not be limited to, topographic surveys; base mapping; inventory of land use, employment, parking, and building floor areas; land acquisition information; analysis of trends; physical planning activities, including a master plan and any other required planning studies; coordination of plans for development in the district with city and county development plans; and application for and use of federal funds which may be available for planning or related purposes.
XVIII	Public Lands and Property	253	State Lands	253.0325	Modernization of state lands records	1) The Department of Environmental Protection shall initiate an ongoing computerized information systems program to modernize its state lands records and documents that relate to all lands that have been acquired by all agencies under the Florida Preservation 2000 Act pursuant to s. 259.101 or the Florida Forever Act pursuant to s. 259.105. All recipients of Florida Forever funds shall annually submit their records for lands acquired for compilation of state lands records by the department. The program shall include, at a minimum: (a) A document management component to automate the storage and retrieval of information contained in state lands records. (b) A land records management component to organize the records by key elements present in the data. (c) An evaluation component which includes the collection of resource and

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						environmental data. (d) A mapping component to generate and store maps of state-owned parcels using data from the land records management and evaluation components. 2) At all stages of its records modernization program, the department shall seek to ensure information systems compatibility within the department and with other state, local, and regional governmental agencies. The department also shall seek to promote standardization in the collection of information regarding state-owned lands by federal, state, regional, and local agencies. (3) The information collected and stored as a result of the department's modernization of state lands records shall not be considered a final or complete accounting of lands which the state owns or to which the state may claim ownership.
XIV	Taxation and Finance	193	Assessment	193.085		(2) The department [Revenue] shall promulgate such regulations and shall make available maps and mapping materials as it deems necessary to ensure that all real property within the state is listed and valued on the real property assessment rolls of the respective counties. In addition, individual property appraisers may use such other maps and materials as they deem expedient to accomplish the purpose of this section.
XXVIII	Natural Resources; Conservation, Reclamation, and Use	373	Water Resources	373.145		Information program regarding hydrologic conditioning and consumption of major surface and groundwater sources.—In order to aid in the development of a better understanding of the unique surface and groundwater resources of this state, the water management districts shall develop an information program designed to provide information concerning existing hydrologic conditions of major surface and groundwater sources in this state and suggestions for good conservation practices within those areas. The water management districts shall utilize the most efficient means to regularly distribute this information to members of the Legislature, the media, and the public.

Review of Relevant Florida Administrative Code

The table below summarized the Florida Administrative Code that related to aerial imagery programs.

Table 2. Summary of Florida Administrative Code related to Aerial Imagery Programs and Requirements

Number	Title	Department	Imagery Related Text
62B-49	Joint Coastal Permits and Concurrent Processing of Proprietary Authorizations	DEP	(3) To obtain a consultation, the interested party must submit a written request for consultation citing this chapter. In addition the applicant is advised to provide a detailed description of the proposed activity, including: (a) The location of the proposed activity; (b) Current topographic and bathymetric surveys; (c) A plan view of the proposed activity; (d) Typical cross-sectional views of any proposed structure(s); (e) Maps or aerial photographs showing the current extent of submerged biological communities and wetlands (if any) in the vicinity of the proposed activity; (f) Geotechnical data on any borrow source and fill site; and (g) Information required under Chapter 253, F.S., and Chapters 18-18, 18-20 and 18-21, F.A.C., Part IV of Chapter 373, and Section 161.041, F.S., to describe the proposed activity and its potential impacts
9K-9.004	Florida Communities Trust	DCA	Submission of Application Material: (8) The following exhibits shall be provided: (a) United States Geological Survey 7 1/2 minute quadrangle map with the boundary of the Project Site clearly delineated. (b) County Tax Appraiser's map clearly delineating the project site boundary, names of the property owners, and parcel tax identification numbers, and ownership boundaries using an appropriate scale. (c) Aerial photograph (1 inch = 2,000 feet or greater detail) with the Project Site boundary clearly delineated.
18-24.003		DEP (Florida Forever Program) Board of Trustees of	(3) All acquisition project applications shall include the following: (a) One original and seventeen legible copies (or originals) of United States Geological Survey (USGS) topographic quadrangle maps, on which the boundaries of

Number	Title	Department	Imagery Related Text
		Internal Improvement Trust Fund	the project are clearly delineated. (b) One original and three legible copies of tax maps, overlain on aerials if available, with the boundaries of the project clearly delineated. If tax aerial overlays are not available, the sponsor of an application shall submit aerials and tax maps separately.
62-701.330	Solid Waste Management Facilities	DEP	Applications shall meet the requirements of Rule 62-701.320, F.A.C., and shall also include the following specific requirements: (a) A regional map or aerial photograph not more than five years old that shows all airports located within five miles of the proposed landfill. The applicant may show the airports on the regional map required in subparagraph 62-701.320(7)(f)3., F.A.C. (b) A plot plan of the site showing dimensions, locations of proposed and existing water quality monitoring wells or points, locations of soil borings, proposed plan of trenching or disposal areas, original elevations, proposed final contours, any previously filled waste disposal areas, and fencing. Cross sections shall be included on the plot plan or on separate sheets showing both the original and proposed fill elevations. The scale of the plot plan shall not be greater than 200 feet to the inch. (c) Topographic maps at a scale of not greater than 200 feet to the inch with 5-foot contour intervals. These maps shall show the proposed fill area, any borrow area, access roads, grades required for proper drainage and cross sections of lifts, special drainage devices if necessary, fencing, and equipment facilities.
62B-56.040	Rules and Procedures for using Sand-filled Geotextile Dune Cores (Permits for Construction and Maintenance)	DEP	(3) To facilitate an effective consultation the applicant is encouraged to provide a detailed description of the proposed activity, including the following items: (a) The location (street address and coordinates) of the proposed activity. (b) Current topographic, vegetation and boundary survey. (c) A plan view of the proposed activity. (d) Typical cross-sectional views of any proposed structure(s). (e) A biological assessment including maps or aerial photographs showing the current extent of natural communities, nesting state or federally threatened or endangered species, and habitat near the proposed activity; and (f) Geotechnical data on any borrow source and fill site.

Number	Title	Department	Imagery Related Text
40B-4.2020	Environmental Resource and Works of the District Permits	WMD-Suwannee River	(b) The following information will be required and shall be submitted in a form and level of detail appropriate to the project. 1. Site information specific to the undeveloped project area including: a. A detailed location drawing with the scale identified; b. A recent (not more than three years prior to the date of application) aerial photograph encompassing the project area at a scale no smaller than one inch equals 800 feet with the project area and total land area identified; c. A topographic map of the site which shows clearly the location, identification, and elevation of bench marks; at least one bench mark required for each major water control structure. Unless otherwise approved by the district, the minimum contour interval of the topographic map shall be two feet;
18.21.013	Applications to Purchase Filled Lands Adjacent to Riparian Uplands	Board of Trustees of Internal Improvement Trust Fund	The following shall be included in each application: (e) Aerial photograph showing the date of flight, if available, with the parcel sought identified thereon;
62-345.400	Uniform Mitigation Assessment Method	DEP	An impact or mitigation assessment area must be described with sufficient detail to provide a frame of reference for the type of community being evaluated and to identify the functions that will be evaluated. When an assessment area is an upland proposed as mitigation, functions must be related to the benefits provided by that upland to fish and wildlife of associated wetlands or other surface waters. Information for each assessment area must be sufficient to identify the functions beneficial to fish and wildlife and their habitat that are characteristic of the assessment area's native community type, based on currently available information, such as aerial photographs, topographic maps, geographic information system data and maps, site visits, scientific articles, journals, other professional reports, field verification when needed, and reasonable scientific judgment.
62-345.500	Uniform Mitigation Assessment Method	DEP	(4) The evaluation must be based on currently available information, such as aerial photographs, topographic maps, geographic information system data and maps, site visits, scientific articles, journals, other professional reports, and reasonable scientific judgment.
9K-7.004	Florida Forever Program-Application	DCA	(7) The following exhibits shall be provided: (a) Copy of each Local Comprehensive Plan objective and policy cited or relied upon in the Application. (b) All proposed text and map amendments to the Local Comprehensive Plan cited

Number	Title	Department	Imagery Related Text
			or relied upon in the Application as pertaining to the Project Site. (c) United States Geological Survey 7 1/2 minute quadrangle map with the boundary of the Project Site clearly delineated. (d) County Tax Appraiser's map clearly delineating the project site boundary, access points, names of the property owners, and parcel tax identification numbers, and ownership boundaries using an appropriate scale. (e) Aerial photograph (1 inch = 2,000 feet or greater detail) with the Project Site boundary clearly delineated.
62C-16.0021	Bureau of Mine Reclamation-Mandatory Phosphate Mine Reclamation Definitions	DEP	(1) "Annual Mining and Reclamation Report" means a report, including maps and aerial photographs, submitted for each mine, which describes and delineates mining operations, reclamation and restoration activities undertaken in the previous calendar year. The report shall also include an estimate of proposed mining, reclamation and restoration activities that the operator intends to carry out during the current year
62C-16.0009	Bureau of Mine Reclamation-Mandatory Phosphate Mine Reclamation	DEP	(1) On or before March 1 of each year after department approval of its Conceptual Reclamation Plan, each operator shall submit to the department an Annual Mining and Reclamation report describing mining and reclamation activities for the previous calendar year and proposed mining and reclamation activities for the current year for each mine under its control. If mining has not yet commenced, then the Annual Mining and Reclamation report need only describe the proposed mining and reclamation activities for the current calendar year. The report shall be submitted on the form incorporated by reference in Rule 62C-16.0095, F.A.C., and shall include: (i) Aerial photographs of all disturbed and mined lands, including the area within one mile of such lands within the mine boundary. The photographs shall be taken after December 1, but as close as reasonably possible, to December 31 of the previous calendar year. The copies submitted to the department shall be of acceptable quality and shall include the date flown, scale, and locations of section corners.
	Annual Reports		
28-20.120	Land Development Regulations	Administration Commission	(3) Section 9.5-336 Existing Conditions Map. (a) *Applicability*: The existing conditions map, which consist of the 1985 Department

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	Land Planning Regulations for the Florida Keys Area of Critical State Concern-Monroe County		of Transportation aerial photographs at a scale of 1" = 200', depicting habitat types coded according to the system set forth in the comprehensive plan is hereby designated, established and incorporated as a part of this chapter; and the originals thereof, which are on file at the offices of the property appraiser and the department of planning, shall be as much a part of this chapter as if the information contained therein were set out in full in this chapter.[2]
18-21.0081	Grandfather Structure Applications	Board of Trustees of Internal Improvement Trust Fund	(1) Applications shall include the following: (e) For revenue generating structures, an aerial photograph dated prior to March 10, 1970. For multi-family residential and other nonrevenue generating structures, an aerial photograph dated prior to March 27, 1982, unless the applicant provides evidence of prior authorization by the board or department, in which case such a photo is not required. (f) An aerial photograph showing all existing structures.
62-770.600	Petroleum Contamination Site Cleanup Criteria	DEP	b. If contamination was only present in the unsaturated zone prior to the interim source removal, groundwater concentrations shall meet the No Further Action criteria of subsection 62-770.680(1), F.A.C., during only one sampling event of representative monitoring wells; (s) Review of historical land use records and existing aerial photographs to determine past uses of the property and location(s) of previous storage tank system(s);
62B-33.024	Thirty-Year Erosion Projection Procedures	DEP	(2) A 30-year erosion projection shall be determined using one or more of the following procedures: (a) An average annual shoreline change rate in the location of the mean high water line (MHWL) at a Department reference survey monument shall be determined and multiplied by 30 years. The resulting distance shall be added landward of the SHWL located on the application survey. The rate shall be determined as follows: 1. The shoreline change rate shall be derived from historical shoreline data obtained from coastal topographic surveys and maps, controlled aerial photography, and similar sources approved by the Department. Data from periods of time that clearly do not represent current prevailing coastal processes acting on or likely to act on the

Number	Title	Department	Imagery Related Text
			site shall not be used.
62-343.040	Environmental Resource Permit Procedures	DEP	1. When a certified surveyed delineation of the extent of wetlands and other surface waters is used, the survey shall be certified as required by Chapter 472, F.S., to meet the minimum technical standards in Chapter 61G17-6, F.A.C. A petitioner seeking a certified surveyed delineation shall have a land surveyor registered in the State of Florida or the surveyor's representative accompany the Department representative on the delineation verification as described in subsection (5), and shall have the land surveyor survey the verified boundaries of wetlands and other surface waters. The certified survey shall include a legal description of, and acreage contained within, the boundaries of the property for which the determination is sought. The boundaries of wetlands and other surface waters must be witnessed to the property boundaries, and shall be capable of being mathematically reproduced from the survey. The petitioner must submit to the Department five copies of the survey, along with five copies of the survey depicted on aerial photographs to complete the petition.
12A-1.041	Photographers and Photo Finishers; Sales by Public Officials of Public Records	DOR	(5)(a) The fee prescribed by law, or the actual cost of duplication, for providing copies of public records by public officers or public employees under Chapter 119, F.S., is exempt from sales tax. (b) Actual cost of duplication means: 3. The charge for copies of county maps or aerial photographs supplied by county constitutional officers may also include a reasonable charge for the labor and overhead associated with its duplication; and 4. The fee charged by custodians of public records for remote electronic means, granted under a contractual arrangement with a user, which fee shall include the direct and indirect costs of providing such access.
62-342.450	Mitigation Bank Permit and Mitigation Bank Conceptual Approval Applications	DEP	To provide the Department with reasonable assurances that the proposed Mitigation Bank will meet the criteria in Section 373.4136, F.S., and in this chapter, and that any proposed system will meet the applicable criteria of Part IV of Chapter 373, F.S., each Mitigation Bank Permit application submitted to the Department shall include the information required under Part IV of Chapter 373, F.S., as applicable, and the information specified below as appropriate for the proposed bank: (1) A description of the location of the proposed Mitigation Bank which shall include:

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			(a) A map at regional scale showing the project area in relation to the regional watershed and proposed mitigation service area; (b) A vicinity map showing the project area in relation to adjacent lands and offsite areas of ecologic or hydrologic significance which could affect the perpetual viability or ecological value of the bank; (c) An aerial photograph identifying boundaries of the project area;
62-709.5000	Design Criteria for Permitted Facilities Criteria for Organics Processing and Recycling Facilities	DEP	(1) The facility site shall have sufficient structural support for the operation including total waste received, material processed, compost stored, equipment, and structures to be built on site. (2) Facility design plans shall include: (a) A map or aerial photograph of the area at a scale of not over 500 feet to the inch showing land use and zoning within one mile of the facility. This map or photograph shall be no more than one year old, unless no substantial changes have occurred since the map or photograph was made. All significant features such as buildings, wells, natural and artificial bodies of water, watercourses and roads shall be indicated and labeled;
40D-8.623	Minimum Wetland Levels Water Levels and Rates of Flow	WMD-SWFWMD	(3) Minimum Wetland Levels are hereby established as set forth in the following table. Wetland water levels are deemed to be below the Minimum Wetland Level when the Long-term Current P50 is below the Minimum Wetland Level. If insufficient data exists to determine if a wetland is below its Minimum Wetland Level, the wetland can be determined to be below the Minimum Wetland Level based on a comparison with wetlands that are hydrologically or hydrogeologically similar or, located in close proximity or, in the same drainage basin or, by use of aerial photographs or evaluation of hydrologic data or Hydrologic Indicators in the subject wetland.
40E-6.101	Content of Applications	WMD-SFWMD	(1) Applications for permits required by this subpart shall be filed with the District. The applications shall contain the following information:
40E-6.201	Works or Lands of the District		(h) Six copies of a scaled or fully dimensioned 8 1/2” × 11” drawing, reflecting the proposed use in plan and elevation views, related to the applicable work of the District, and tied to a known reference point in the immediate area of the proposed use. Larger drawings or aerial photographs shall be required, if necessary to adequately show the location and nature of the proposed use. A property survey, indicating the location of the District right-of-way boundary line shall also be

Number	Title	Department	Imagery Related Text
			provided.
62-672.300	Construction of New Dams.	DEP	(a) After completion of construction and before the above-grade deposition of industrial waste behind the dam, the permittee shall contact the department to arrange for a department representative to inspect the facility in the company of the permittee. The owner of an earthen dam shall maintain in a permanent file the following construction records pertaining to said dam. The owner shall furnish a copy of the file and certification of completion of construction within 30 days after completion of the dam to the department. 1. Aerial photo of construction site after mining in the immediate area has been terminated and before shaping of the final dam.
	Minimum Requirements for Earthen Dams Used in Phosphate Mining…		
62-672.500	Inspection	DEP	Personnel or agents of the department may accompany inspectors on any inspection required by this rule, or inspect settling areas at any other time which is reasonable under the circumstances involved. They may also examine any inspection reports and be furnished copies thereof upon request. (1) A completed new dam shall be thoroughly inspected prior to the deposition of industrial wastes above ground level behind it. Toe drains, spillways and water level control structures shall be certified by the design engineer as meeting all specifications of the design, and degree of compaction of the fill shall also be certified. Legible photographs, either aerial or ground, may be used to document this initial inspection, but shall not in themselves constitute certification. A complete file describing the items inspected and their condition shall be maintained by the owner, and a copy shall be furnished to the department prior to the above-grade deposition of industrial wastes behind the dam.
	Minimum Requirements for Earthen Dams Used in Phosphate Mining…		
62-672.670	Inspection and Maintenance Requirements for Perimeter Earthen Dikes	DEP	(1) Personnel or agents of the department may accompany inspectors on any inspection required by this rule, or inspect perimeter earthen dikes at any other time which is reasonable under the circumstances involved. They may also examine

Number	Title	Department	Imagery Related Text
	Minimum Requirements for Earthen Dams Used in Phosphate Mining…		any inspection reports and be furnished copies thereof upon request. (2) A completed new perimeter earthen dike shall be thoroughly inspected prior to the placement of process water behind it. Spillways and water level control structures shall be certified by the design third-party engineer as meeting all specifications of the design, and degree of compaction of the fill shall also be certified. Legible photographs, either aerial or ground, may be used to document this initial inspection, but shall not in themselves constitute certification. A complete file describing the items inspected and their condition shall be maintained by the owner, and a copy shall be furnished to the department for approval prior to the deposition of process water behind the dike
62-672.770	Phosphogypsum Stack Inspection and Maintenance Minimum Requirements for Earthen Dams Used in Phosphate Mining…	DEP	(2) A completed new phosphogypsum stack system, including the starter dike, shall be thoroughly inspected prior to the deposition of process water in it. The liner, spillways and water level control structures shall be certified by the design third-party engineer as meeting all specifications of the design, and the degree of compaction of the fill shall also be certified. Legible photographs, either aerial or ground, may be used to document this initial inspection, but shall not in themselves constitute certification. A complete file describing the items inspected and their condition shall be maintained by the owner, and a copy shall be furnished to the department.
40B-3.101	Permitting Well Construction	WMD-SRWMD	(5) The applicant shall provide with the application a site plan to scale of the property identified in (2)(h) above, which includes any existing or proposed improvements, and clearly identifies the proposed well location. If the proposed well location is within a floodprone area of the Suwannee River system defined as the 100-year floodplain of the Suwannee, Alapaha, Withlacoochee, Santa Fe, and Aucilla Rivers as depicted on official Flood Hazard Boundary Maps or Flood Insurance Rate Maps issued by the Federal Emergency Management Agency for each county and community, the site plan shall include the land surface elevation at the proposed well location and the site plan and elevation(s) shall be certified by a Professional Surveyor and Mapper registered in Florida under Chapter 472, F.S. If the proposed well location is not within a floodprone area of the Suwannee River system defined as the 100-year floodplain of the Suwannee, Alapaha, Withlacoochee, Santa Fe, and Aucilla Rivers as described above, the applicant may include a copy of the appropriate recent aerial photograph with property

Number	Title	Department	Imagery Related Text
			boundaries available from the offices of the respective County Property Appraiser, or copy of a plat or other survey, annotated to show all improvements and proposed well location in order to satisfy the requirements of this rule.
62-673.320	Permitting of Phosphogypsum Stack Systems Phosphogypsum Management	DEP	) Preparation of application. The application for a permit shall be prepared and signed by the applicant on Form 62-673.900(1), Application for Permit to Construct/Operate a Phosphogypsum Stack System, effective 3-25-93, which is adopted and incorporated herein by reference. This form may be obtained by contacting the appropriate district office or by writing the Department of Environmental Protection, Bureau of Water Facilities Planning and Regulation, 2600 Blair Stone Road, MS3535, Tallahassee, Florida 32399-2400. The application shall include all information necessary for the Department to make an evaluation of the proposed facility to ensure that it will pose no significant threat to public health or the environment. The permit application and supporting information shall include the following: (g) A map or aerial photograph of the area showing land use and zoning within one mile of the phosphogypsum stack system. This map, or photograph which shall be taken within one year of the permit application, shall be of sufficient scale to show all homes, industrial buildings, wells, water courses, dry runs, rock out-croppings, roads and other significant details. All significant features shall be indicated and labeled on the map or aerial photograph.
62C-26.007	Geophysical Applications Conservation of Oil and Gas: Permitting	DEP	2. Shot Point Maps. Prior to drilling and loading, the applicant shall provide a map showing all intended shot points and, within 10 days of completion, update the map to show actual shot points. This location map shall be on an aerial photographic base at a scale sufficiently large, preferably 1 inch to 400 feet, to allow reoccupation of all shot points.

Number	Title	Department	Imagery Related Text
62C-30.005	Application to Drill in the Big Cypress Watershed Conservation of Oil and Gas: Wetlands and Submerged Lands	DEP	2. Topographical and engineering surveys of the drill site shall be prepared and together with an aerial photograph of the drill site at a large scale, which can be obtained from existing governmental photographs with the well spotted thereupon, shall be made a part of the Application to Drill (Form 3).
62-301.400	Determination of the Landward Extent of Surface Waters of the State	DEP	(1) The line demarcating the landward extent of surface waters, as defined in Section 403.031, F.S., shall be established for any water body, pursuant to Section 403.817, F.S., by dominant plant species. Dominance shall be determined in a plant stratum (canopy, subcanopy, or ground cover). The canopy is composed of all woody plants with a trunk 4 inches or greater in diameter at breast height (dbh). Dbh is measured at 4.5 feet above the ground. The subcanopy is composed of all woody plants with a trunk or stem dbh between 1 and 4 inches and a height greater than 3 feet. The ground cover includes all other plants. The top stratum shall be used in the determination of dominance unless the top stratum constitutes less than 10% areal extent or unless a preponderance of the evidence establishes that the top stratum is not indicative of normal hydrologic conditions, for example, as a result of artificial alteration. In these cases a more representative stratum shall be used. The burden of proof shall be with the party asserting that a stratum other than the top stratum should be used to determine dominance. (a) The existence of a surface water, as defined in Section 403.031, F.S., shall first be identified. Vegetation shall then be inspected moving landward. In all cases the department shall attempt to locate the line demarcating the landward extent of waters of the state by visual methods or by aerial photointerpretation. The line demarcating the landward extent of the waters shall be the boundary of the area where, using the submerged and transitional species listed in paragraphs (2) and (3) below: 1. The areal extent of submerged and transitional species or any combination thereof, in the selected stratum, is greater than 50% of all the plant species for that stratum, and 2. The areal extent of the submerged species in the selected stratum is greater than 10% of the areal extent of all the plant species in that stratum, and
28-20.025	Land Development Regulations Land Use Regulations for the Florida Keys Area of Critical Stat	Administrative Commission	(a) *Authority*: The board of county commissioners, upon the recommendation of the planning commission, shall adopt the existing conditions map which shall consist of the 1985 Department of Transportation aerial photographs at a scale of 1'' = 200' depicting habitat types coded according to the system set forth in Volume I of the

Number	Title	Department	Imagery Related Text
	Concern--Monroe County		Monroe County Comprehensive Plan.
62-341.610	General Permit to Perform Prospecting Activities for Phosphate Minerals	DEP	A person wishing to utilize this general permit shall submit to the office of the Department to which the prior notice was originally given, an annual schedule of proposed prospecting activities within the prospect areas including location maps, aerial photographs showing the proposed prospecting lines, and approximate commencement and completion dates for the activities planned for each prospect area. The annual schedule, or modifications to the annual schedule, must be submitted at least thirty days prior to the commencement of the proposed activity. Where practicable, the annual schedule should be filed with the office of the Department to which the original notice was given no later than June 1 for the fiscal year July 1 through June 30.
62-341.611	General Permit for Temporary Dragline Crossings of Waterways	DEP	(b) A person wishing to utilize this general permit shall submit to the Department office to which the original notice was given, an annual schedule of proposed temporary dragline crossing areas including location maps, aerial photographs with proposed temporary dragline crossings, typical drawings, and approximate commencement and completion dates for the activities planned. Additionally, the plans shall include proposed restoration procedures for each temporary dragline crossing. The annual schedule, or modifications to the annual schedule, must be submitted, together with the required documentation, at least thirty days prior to the commencement of the proposed activity. Where practicable, the annual schedule and documentation should be filed with the Department no later than June 1 for the fiscal year July 1 through June 30.
62-341.612	General Permit for Low Water Crossings	DEP	(c) A person wishing to utilize this general permit shall submit to the appropriate Department office, an annual schedule of proposed low water crossing sites including location maps, aerial photographs with proposed low water crossing sites, typical drawings, and approximate commencement and completion dates for the activities planned. Additionally, the plans shall include proposed restoration procedures for each low water crossing. The annual schedule, or modifications to the annual schedule, must be submitted, together with the required documentation, at least 30 days prior to the commencement of the proposed activity. The annual schedule and documentation shall be filed with the Department no later than June 1 for the fiscal year July 1 through June 30.
5E-13.023	Source Reduction Prerequisites Mosquito Control Program	DACS	(1) When proposing source reduction projects a district or county shall prepare and submit to the department:

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	Administration		(a) Entomological investigation report on suspected arthropod breeding areas.
62-340.100	Intent	DEP	(b) Maps, aerial photographs or photostats of aerial photographs on which location of proposed project is shown and identified by appropriate number. Locations of proposed drainage ditches, dikes, impoundments, hydraulic fills, grading and filling areas, etc., indicated with nonpermanent markings (1) This rule's intent is to provide a unified statewide methodology for the delineation of the extent of wetlands and surface waters to satisfy the mandate of Section 373.421, F.S. This delineation methodology is intended to approximate the combined landward extent of wetlands as determined by a water management district and the Department immediately before the effective date of this rule. Before implementing the specific provisions of this methodology, the regulating agency shall attempt to identify wetlands according to the definition for wetlands in subsection 373.019(25), F.S., and subsection 62-340.200(19), F.A.C., below. The landward extent of wetlands shall be determined by the dominance of plant species, soils and other hydrologic evidence indicative of regular and periodic inundation or saturation. In all cases, attempts shall be made to locate the landward extent of wetlands visually by on site inspection, or aerial photointerpretation in combination with ground truthing, without quantitative sampling. If this cannot be accomplished, the quantitative methods in paragraph 62-301.400(1)(c), F.A.C., shall be used unless the applicant or petitioner and regulating agency agree, in writing, on an alternative method for quantitatively analyzing the vegetation on site. The methodology shall not be used to delineate areas which are not wetlands as defined in subsection 62-340.200(19), F.A.C., nor to delineate as wetlands or surface waters areas exempted from delineation by statute or agency rule.
	Delineation of the Landward Extend of Wetlands and Surface Waters		

Number	Title	Department	Imagery Related Text
62-340.300	Delineation of Wetlands	DEP	(1) Before using the wetland delineation methodology described below, the regulating agency shall attempt to identify and delineate the landward extent of wetlands by direct application of the definition of wetlands in subsection 62-340.200(19), F.A.C., with particular attention to the vegetative communities which the definition lists as wetlands and non-wetlands. If the boundary cannot be located easily by use of the definition in subsection 62-340.200(19), F.A.C., the provisions of this rule shall be used to locate the landward extent of a wetland. In applying the provisions of this rule, the regulating agency shall attempt to locate the landward extent of wetlands visually by on site inspection, or aerial photointerpretation in combination with ground truthing.
62-807.660	Fees, Disbursement of Funds, Contracts Natural Gas Transmission Pipeline Siting	DEP	5. Application-related expenses for the following: d. Materials (e.g. maps, aerial-photographs).
62-673.620	Closure Procedures Phosphogypsum Management	DEP	(2) Final survey and record drawings. A final survey shall be performed after closure is complete by an engineer or a registered land surveyor to verify that final contours and elevations of the phosphogypsum stack system are in accordance with the plan as approved in the permit. Aerial mapping techniques which provide equivalent survey accuracy may be substituted for the survey. The survey or aerial mapping information shall be included in a report along with information reflecting the record drawings of the phosphogypsum stack system. Contours should be shown at no greater than five-foot intervals. The owner or operator shall submit this report to the Department in accordance with the closing schedule.
62-312.020	Definitions Dredge and Fill Activities	DEP	(2) Final survey and record drawings. A final survey shall be performed after closure is complete by an engineer or a registered land surveyor to verify that final contours and elevations of the phosphogypsum stack system are in accordance with the plan as approved in the permit. Aerial mapping techniques which provide equivalent survey accuracy may be substituted for the survey. The survey or aerial mapping information shall be included in a report along with information reflecting the record drawings of the phosphogypsum stack system. Contours should be shown at no greater than five-foot intervals. The owner or operator shall submit this report to the Department in accordance with the closing schedule.
62-312.040	Jurisdictional Declaratory Statements	DEP	1) Pursuant to Section 403.914(1), F.S., a property owner, a person who has power of eminent domain, or any other person with a legal or equitable interest in a property may petition the department for a formal jurisdictional determination. The

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	Dredge and Fill Activities		petition shall contain: (a) A vicinity map showing the location, including Section, Township and Range, and areal extent of the property in question; (b) Written authorization to enter the property signed by the property owner; (c) Four copies of blue line prints of recent aerial photographs which accurately reflect the current conditions on the site with the property boundaries to be inspected clearly delineated, along with identification of all major roads and the north bearing;
62C-17.0085	Acquisition Standards and Criteria Master Reclamation Plan for Lands Disturbed by the Severance of Phosphate Prior to July 1, 1975	DEP	(3) Costs incurred during the preparation of an application for acquisition by the state are reimbursable. The applicant may apply for reimbursement of costs necessary to file the application, such as surveys, aerial photographs, appraisals, and application preparation. Any costs which are paid for by the Division of State Lands are not reimbursable to the applicant. Applicant's reasonable and necessary eligible costs are reimbursable after the parcel is approved by the Department for acquisition within the funds available.
62C-17.009	Applications Master Reclamation Plan for Lands Disturbed by the Severance of Phosphate Prior to July 1, 1975	DEP	(8) Applications shall be made on forms provided by the Bureau. The Landowner shall submit three (3) copies of the completed application which shall include all the information, certifications, aerial photographs, drawings, and reports certified by an engineer and/or surveyor registered to practice in the State of Florida, as applicable. Each application shall be signed and bear the seal of an engineer registered to practice in the State of Florida, except those applications involving only donation or purchase of nonmandatory lands. Form DEP 53-011(16) "Reclamation Program Application" is incorporated by reference into this rule effective April 1990. Copies of the form may be obtained from the Bureau.
62C-39.003	Notices and Information Required Reclamation Requirements For Solid Resources Other Than Phosphate, Limestone, Heavy Minerals and Fuller's Earth		(3) Information Required. The following information shall be included as part of the notice of intent to mine or mining, whichever is applicable, for each mine subject to this rule. This information shall be submitted in the form of an executed copy of DEP Form 53-031(16), incorporated by reference in Rule 62C-39.014, F.A.C. (d) A list of each mine covered by the notice of intent to mine or mining; a description of the location of each mine, including the county, township, range, and section; and a recent aerial photograph that clearly indicates the location of each existing or future mine. Aerial photographs obtained from the county property

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			appraiser's office, a commercial source, or through the Department of Transportation, Bureau of Topography, shall be acceptable.
62C-39.004	Document Format and Standards	DEP	The use of standardized forms referenced in this rule is required to insure that all requests that require agency action are handled in an efficient and expeditious manner. Additional pages needed to complete each form shall conform to the standards in this section. The number of copies to be submitted shall be specified on each form. The following standards shall apply: Original maps, drawings, and aerial photographs may be larger than 8 1/2 by 11 inches. (4) All notices, maps, aerials, etc. shall include the date prepared or revised
	Reclamation Requirements For Solid Resources Other Than Phosphate, Limestone, Heavy Minerals and Fuller's Earth		
62C-36.003	Notices, Plans, and Information Required Limestone Reclamation Requirements	DEP	(a) Prior to January 1, 1988, each operator shall provide the secretary a documented list of its existing mines which shall include the operator's name, address, phone number and the name, address, phone number, and plan view of each mine. The plan view shall be a map or good quality aerial photograph facsimile which includes the mine name, mine boundary, north arrow, section-township-range data, marked section corners, scale, date prepared, and date flown, if applicable.
62C-36.001	Reports Limestone Reclamation Requirements	DEP	(1) On or before April 1 of each year, each operator shall submit to the department a report for the previous calendar year for each mine under his control. No report shall be required in calendar year 1987; however, any report submitted in calendar year 1988 shall cover the period October 1, 1986, through December 31, 1987. No report shall be required for existing mines until March 1, 1990; this report shall cover the previous calendar year only. Each report shall be submitted on the form incorporated by reference in Rule 62C-36.014, F.A.C., and shall include the following for the report period: (g) A map that illustrates paragraphs (b) through (f), above. To the extent possible, maps submitted with the second and each successive report shall include the information shown on maps submitted with previous reports. The maps may be drawn on plain paper or an aerial photograph facsimile and shall meet the document standards in Rule 62C-36.004, F.A.C.

Number	Title	Department	Imagery Related Text
62C-17.010	Reclamation Cost Mater Reclamation Plan for Lands Disturbed by the Severance of Phosphate Prior to July 1, 1975	DEP	(2) In establishing maximum reimbursable reclamation costs, the Department recognizes the existence of multiple landforms within certain parcels. Funding of such programs shall be on a prorata basis for each landform present in the parcel based on the acreage of each landform present. The Landowner shall submit an aerial photograph of the program site clearly indicating the boundaries and acreages of those lands. The outside toe of the dam shall be considered the outside boundary of a clay settling area.
62-312.810	General Permit to Perform Prospecting Activities for Phosphate Minerals Dredge and Fill Activities	DEP	(2) This general permit is subject to the general conditions of Rule 62-4.540, F.A.C., and the following specific conditions: (a) A person wishing to utilize this general permit shall submit to the appropriate DEP district office, an annual schedule of proposed prospecting activities within the prospect areas including location maps, aerial photographs showing the proposed prospecting lines, and approximate commencement and completion dates for the activities planned for each prospect area. The annual schedule, or modifications to the annual schedule, must be submitted at least thirty (30) days prior to the commencement of the proposed activity. Where practicable, the annual schedule should be filed with the Department no later than June 1 for the fiscal year July 1 through June 30.
62.312.811	General Permit for Temporary Dragline Crossings of Waterways Dredge and Fill Activities	DEP	(d) A person wishing to utilize this general permit shall submit to the appropriate DEP district office, an annual schedule of proposed temporary dragline crossing areas including location maps, aerial photographs with proposed temporary dragline crossings, typical drawings, and approximate commencement and completion dates for the activities planned. Additionally, the plans shall include proposed restoration procedures for each temporary dragline crossing. The annual schedule, or modifications to the annual schedule, must be submitted, together with the required documentation, at least thirty (30) days prior to the commencement of the proposed activity. Where practicable, the annual schedule and documentation should be filed with the Department no later than June 1 for the fiscal year July 1 through June 30.
12D-1.009	Mapping Requirements General Rules	DOR	(1) Each county property appraiser shall have and maintain the following: (a) Aerial photography suitable for the needs of his office. (2) Suggested procedures for establishing and maintaining an adequate cadastral mapping program to meet these requirements are contained in the mapping

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			guidelines of the Department of Revenue's Manual of Instructions.
5J-17.050	Minimum Technical Standards: Definitions	DACS	Defines terms related to technical standards for mapping and surveying
5J-17.051	Minimum Technical Standards: General Survey, Map, and Report Content Requirements	DACS	The public must be able to rely on the accuracy of measurements and maps produced by a surveyor and mapper. (b) Surveyors and mappers must achieve the following minimum standards of accuracy, completeness, and quality: The accuracy of the survey measurements shall be premised upon the type of survey and the expected use of the survey and map. All measurements must be in accordance with the United States standard, using either feet or meters. 2. Records of these measurements shall be maintained for each survey by either the individual surveyor and mapper or the surveying and mapping business entity. 3. Measurement and computation records must be dated and must contain sufficient data to substantiate the survey map and insure that the accuracy portion of these standards has been met. (3) Surveys, Maps, and/or Survey Products Content. (a) REGULATORY OBJECTIVE: In order to avoid misuse of a survey and map, the surveyor and mapper must adequately communicate the survey results to the public through a map, report, or report with an attached map. Any survey map or report must identify the responsible surveyor and mapper and contain standard content. (b) Surveyors and mappers must meet the following minimum standards of accuracy, completeness, and quality
5J-17.052	Minimum Technical Standards: Specific Survey, Map, and Report Requirements	DACS	(4) Control Survey: (a) Geodetic Control Surveys: When applicable, all geodetic

Number	Title	Department	Imagery Related Text
			control surveys, both vertical and horizontal, shall conform to the Standards and Specifications for Geodetic Control Networks (1984) as set forth by the Federal Geodetic Control Committee (FGCC), which Standards and Specifications are incorporated herein by reference, effective 5-13-96, and the Geospatial Positioning Accuracy Standards Parts 1, 2, and 3, FGDC-STD-007.1-1998, entitled "Geospatial Positioning Accuracy Standards Part 2: Standards for Geodetic Networks", and FGDC-STD-007.3-1998, entitled "Geospatial Positioning Accuracy Standards Part 3: National Standard for Spatial Data Accuracy", which are hereby incorporated by reference, effective 5-18-00, copies of which may be obtained via the internet web site (http://fgdc.gov/standards_publications/). No use of the terminology of these standards may be made without completely adopting and following all the standards in their entirety. When these standards are not employed, then a survey, map, or report shall explain applicable standards used in the geodetic control survey. All geodetic control survey maps or reports shall show the horizontal and vertical datum used and shall contain adequate graphical or written descriptions of the locations, construction and marking of all marks used or set and shall explain methods employed in the survey and adjustment. (b) Other Control Surveys: Any control survey map or report shall detail the datum used and control stations used in a manner consistent with the general survey and map provisions of subsection 5J-17.051, F.A.C. (7) Ortho-Images/Photos: (a) The survey, map, and/or report must contain a list of control points employed in geo-referencing the image along with the source of control positions used. (b) Positional Accuracy: Feature accuracies shall be stated. (c) The Ortho-Image/Photo shall comply with the December 1996

Number	Title	Department	Imagery Related Text
			US Department of the Interior, US Geological Survey National Mapping Divisions, "National Mapping Program Technical Instructions Part 2 Specifications Standards for Digital Orthophotos," which are incorporated herein by reference.
	Permit Requirements-Application Checklist	SWFWMD	Aerial photographic map(s) that are less than three years ole of all property to be covered under the permit are required for all permits. They are available from the county.

Appendix D: Statewide Aerial Imagery Investment and Benefits

Cost/Benefit Summary

Benefits from a coordinated statewide aerial imagery program are realized across all levels of government and within the private sector. This document identifies many of those benefits and attempts to quantify, to the extent possible, the financial benefits from a comprehensive statewide aerial imagery program.

Annual Statewide Orthoimagery Program

$2.6 to $3.1 Million Investment

$12.4 to $31.1 Million Benefits

Based on responses to a survey of aerial imagery users in Florida, the financial benefits to Florida from a statewide orthoimagery program ranges between $12.4 and $31.1 million per year (see details in Section 3). Respondents identified another $2.4 million a year in benefits from the use of oblique aerial imagery.

An annual investment of between $2.6 and $3.1 million to maintain a statewide orthoimagery program meeting minimum resolution and accuracy standards for the Florida Department of Revenue and the US Geological Survey is necessary. This investment will support collection of one-third of the state (approximately 21,900 square miles) annually and should be funded on a continuing basis. The range in investment is driven by the specification of the orthoimagery and any value added products or that may be included such as planimetrics, oblique imagery, stereo pairs, or additional file formats. This level of annual investment is sufficient to support acquisition, processing, quality control, and distribution of orthoimagery for the entire state within 3 years and funding should be continued beyond that window so imagery can be regularly updated.

Under this program the minimum annual benefits from the program to the taxpayers of Florida would be approximately $4 for every $1 invested and the maximum potential benefit realized could exceed $10 for every dollar invested in the program.

Benefits From Aerial Imagery

Aerial imagery offers many benefits including improved decision making, improved efficiency of operation, and enhanced services and products as discussed in detail below. A coordinated statewide approach to imagery acquisition and distribution can ensure that taxpayer investments offer the highest return possible.

In general, the types of value most often realized by having up to date aerial imagery available can be characterized in the following manner:

Operational and Efficiency Gains—Expected gains in current personnel efficiency and productivity will allow work to be accomplished in less time and with less expense. These can include reduced efforts for completing tasks, reduction in expenditures for infrastructure or assets, elimination of redundancies of processes, better decision-making, or more efficient use of resources.

Customer Benefits—Benefits realized by providing better services or products directly to the taxpayer and/or customer. This class of benefits can be found in government as well as in private firms using aerial imagery. These benefits can include faster delivery of services, more convenient access to information, and a better experience receiving products or services. More efficient and effective interaction with customers will save them time and money.

Cost Savings and Cost Avoidance—Reduction in current monetary expenses such as contract costs and direct expenses. Lowering or completely avoiding increased costs that would be incurred without the use of imagery, when new programs, regulatory requirements, or other new demands are placed on existing organizations.

Revenue Enhancement—Use of imagery and derived data in applications and business processes will result in increased revenue collection from existing or new sources.

As a result of these benefits, organizations can better meet their varied missions for economic stimulation, environmental management, public safety, public education, and increased revenue or profit.

Financial benefits will help justify the investment needed to maintain current aerial imagery for Florida and support a statewide imagery Business Plan. Investments in this imagery may be from state sources, county and local governments, the Federal government, or the private sector. Benefits are for the large part based on anecdotal information received from participants in this planning process. In addition, the benefits contain some assumptions that may vary depending on the detailed specifications of each aerial imagery project. These benefits are not necessarily a comprehensive evaluation of all of the benefits that may be realized and have not been verified for accuracy. In order to reduce the potential for overestimation of benefits, the assumptions made in formulating the results are generally conservative. As a result, these values

should provide rationalization for expenditures, but should be used with caution and further elaborated as each initiative is initiated.

2.1 Examples Florida's Benefits from OrthoImagery

The many benefits of a cooperative and coordinated approach to maintaining current orthoimagery were identified through a process of stakeholder outreach and community including through responses to an on-line survey. A few that represent clear opportunities for making a real difference in saving lives and economic development in Florida include:

Property Tax Assessment – Tax assessors currently rely on field evaluations to determine if additions to property have been accurately recorded for taxation. In some instances, additions are not viewable or accessible to the field evaluators, increasing the potential of missing unrecorded additions. Orthoimagery allows for these assessors to view additions on properties without field visits, saving time spent in the field and increasing the probability of finding unrecorded additions to tax property owners more equitably.

Emergency Management, Response, and Recovery—Florida faces significant risks from hurricane-induced costal storm surge and flooding. Orthoimagery and derived data when applied to evacuation route planning, flood mitigation and coastal zone management allows Florida to improve public safety, save lives, and avoid costs associated with disaster recovery. In the absence of diligent and concerted efforts to advance the availability of high quality geospatial data to apply to these problems it is only a matter of time before lives are lost.

Responding to emergency situations requires the information in real-time or in a matter of hours, and data to be updated as events unfold. Continually collecting data from multiple sources in such short timeframes demands that the datasets are easy to integrate using automated means. Standards and policies need to be established to allow post event aerial imagery to be made available in a timely manner. Better orthoimagery will help with logistics of emergency response in remote areas, including ingress and egress from a disaster area.

Public Safety/Homeland Security – The operations of law enforcement often require collaboration and communication across jurisdictional boundaries and between government organizations. Aerial imagery increases public safety, including improved 911 services, and emergency response management integration. Orthoimagery is used to support tactical surveillance and for planning for police tactical and homeland security units.

Economic Development— Activities which boost the economic opportunities for Floridians benefit from orthoimagery availability. Traditional site selection for industry and commerce is made more efficient and effective through the use of these data. Extractive industries and agriculture use orthoimagery to improve the efficiencies of operations, and efficiently manage timber and citrus groves.

Water Resources / Water Management—The availability of orthoimagery allows water resource agencies to develop and maintain hydrography and water quality data for streams and shorelines. Well-developed stream networks derived from current and accurate orthoimagery are useful in a variety of applications including downstream contamination tracking, fish migration and habitat analysis, flood planning and mitigation.

Frequent orthoimagery is required for the process of creating current land use/land cover information which is in turn used to improve the accuracy of estimates of the contribution of non-point sources of pollution to the State's waters. These data also support the development of Total Maximum Daily Load requirements and Basin Management Action Plans.

Orthoimagery is essential to understanding the effect of climate change upon water resources. An example is the analysis of future drinking water locations impacted by the increased potential for salt water intrusion from sea level rise.

Wild Fire Management—High quality orthoimagery is necessary to support fire fighters in the task of extinguishing a wild fire and in planning for risk mitigation. Fire fighters lives depend on these data and the potential to preserve property and lives of citizens is greatly improved as these data are made available. Current orthoimagery is used to provide prescribed fire crews with accurate mapping for safety routes and safety zones to assist in safeguarding firefighters and the public during fire events.

Coastal Zone Management—The coastal zone is home to a large percentage of Florida's residents, represents a significant economic engine for tourism, and is extremely variable with constant changes. This zone is particularly vulnerable to environmental issues associated with sea level rise and climate change. Orthoimagery based geospatial data (data on coastlines, habitats, and submerged aquatic vegetation) and analysis can help researchers measure and better understand changes in this dynamic region. This understanding supports development of appropriate mitigation and polices supporting efficient management of coastal resources.

Property Ownership Protection—Imagery can be used to identify activities that involve trespassing on property. This can involve identification of activities which are not permitted on State or Federal land but can also be used to protect private property rights. Public and private easements are monitored using orthoimagery saving many jurisdictions extensive field verification.

Wildlife Habitat Monitoring / Protection – Statewide orthoimagery can improve assessment of the status of wildlife habitats, and can be used to more effectively monitor and protect these habitats over time. This has the potential to reduce costs by reducing the number of field visits to remote areas. In addition, permitting and monitoring land use including mineral, water and infrastructure will be more easily accomplished with a better understanding of locations and the impacts of proposed projects. For many of Florida's environmental agencies historical and

current orthoimagery is used to review development proposals and to monitor post development impacts.

Orthoimagery is also used by natural resource agencies to more effectively manage environmental assessment surveys. The imagery is used to plan transect data collection in a precise and directed manner to gain the most data with the least amount of field crew time, expense, and intrusion into sensitive habitats. Vegetation analysis in natural areas is possible with orthoimagery.

Code Enforcement/Legal Proceedings—Availability of current and historic orthoimagery can prove to be instrumental in code enforcement proceeding and in legal actions related to code violations. The historical imagery can definitively identify conditions prior to and after a man made environmental change. This can include documentation of historical wetlands areas, original stream conditions, and the existence of structures. In many jurisdictions orthoimagery is used to document the location of existing structures on the ground, structures that have been modified either legally or without a permit, and newly constructed structures. This allows for enforcement of building and zoning codes while minimizing the quantity of field work required.

In a clear demonstration of the potential value of current and historic orthoimagery, the FDOT and US Fish and Wildlife Service were able to win a lawsuit where $65 million in damages had been requested from a landowner. The landowner maintained that FDOT activities had caused his property to become a wetland which amounted to an illegal taking of his property. Historical orthoimagery demonstrated to the judge that historic conditions clearly identified FDOT was not at fault. In this case the imagery was also used to demonstrate that further activities on the site to prepare it for development would result in flooding impacts downstream.

2.2 Reported Benefits from OrthoImagery

The recent survey of Florida aerial imagery users requested information on the specific types of benefits that have been demonstrated through the availability and use of orthoimagery. The results of that survey are shown in Table 1. Over 90% of survey respondents reported that orthoimagery provided real benefits in improved decision making, improved timeliness and quality of data and services, improved mission performance, and improved staff productivity.

Table 1. Benefits from Orthoimagery

Benefits	Yes		No		NA		Total
Improved Decision Making	238	97.94%	0	0.00%	5	2.06%	243
Improved Timeliness and Quality of Data and Services	227	94.58%	5	2.08%	8	3.33%	240
Improved Mission Performance	225	93.75%	3	1.25%	12	5.00%	240
Improved Staff Productivity/Labor Cost Savings	214	91.06%	9	3.83%	12	5.11%	235
Improved Public Satisfaction	192	81.01%	12	5.06%	33	13.92%	237
Protection/Enhancement of Natural Resources	179	75.85%	9	3.81%	48	20.34%	236
More Effective Management/Allocation of Field Services	175	75.76%	19	8.23%	37	16.02%	231
Enhance Public Participation and Awareness	167	71.67%	20	8.58%	46	19.74%	233
Catalyst for Partnerships and Information Sharing	153	66.23%	27	11.69%	51	22.08%	231
Reduction in Duplication and Redundancy	147	64.47%	37	16.23%	44	19.30%	228
Reduced Travel Times and Transportation Costs	140	60.87%	41	17.83%	49	21.30%	230
Increased Accountability and Transparency	115	51.57%	37	16.59%	71	31.84%	223
Avoidance of New Costs	115	51.11%	42	18.67%	68	30.22%	225
Savings in Capital Project Design and Construction	111	48.90%	39	17.18%	77	33.92%	227
Legal Compliance/Protection Against Expensive Legal Claims	108	47.79%	25	11.06%	93	41.15%	226
Cultural Resource Enhancement and Protection	107	47.35%	38	16.81%	81	35.84%	226
Reduced Costs from Asset Management	105	46.46%	43	19.03%	78	34.51%	226
Reduced Costs Through Joint Funding	102	44.93%	48	21.15%	77	33.92%	227
Code Compliance/Improved Voluntary Compliance	99	43.42%	26	11.40%	103	45.18%	228
Savings of Life and Property	91	40.27%	29	12.83%	106	46.90%	226
Support for Economic Development Initiatives	81	35.84%	52	23.01%	93	41.15%	226
Increase in Revenue [improved collection of taxes, fees, fines)	70	31.11%	49	21.78%	106	47.11%	225
Improved Public Health and Wellness	62	27.93%	47	21.17%	113	50.90%	222
Protection from Catastrophic Records Loss	47	21.08%	54	24.22%	122	54.71%	223

2.3 Examples of Benefits from Oblique Imagery

Oblique imagery is frequently used to supplement the same business processes that use traditional orthoimagery. As such, many of the same types of benefits are available but with enhancements based on additional capabilities inherent in oblique imagery.

The Florida aerial imagery users' survey asked respondents to provide insight into their specific use of oblique imagery and the benefits that use provides. Many respondents are using oblique imagery in property appraisal operations to validate building conditions, confirm measurements, and look for changes that have not been reflected in the tax rolls. These business processes can be accomplished using the oblique imagery and reduce the need for field work, increase efficiencies of staff since they are not required to physically inspect every location, and improve the quality of the tax rolls without tremendous expense.

Coastal managers use the oblique imagery to identify construction violations, and to conduct storm damage assessment to both structures and shoreline without the expense of field inspections.

A private land surveying firm reported using aerial oblique imagery to check existing conditions at a site without having to drive to it. This reduction in travel and increase in availability of these data aids them in the preparation of proposals as well as preparation for awarded projects.

3.0 Financial Benefits from ORTHOIMAGERY

The financial benefits cited in this document are based on analysis of survey responses from Florida aerial imagery users. No attempt has been made to validate the reported benefits by respondents.

3.1 Reported Orthoimagery Benefits

While government generally does not expect a return on investment in the traditional sense, it is important to consider cost savings and other benefits when budget requests are submitted. Table 2 summarizes orthoimagery tangible benefits as reported by survey respondents.

Table 2. Tangible Benefits from using Orthoimagery

Value of Benefits over 5 years	Unknown or N/A	$1 to $9,999	$10,000 to $49,999	$50,000 to $99,999	$100,000 to $199,999	$200,000 to $499,999	$500,000 to $999,999	Over $1 million
Staff Productivity and Labor Cost Savings	153	19	22	13	10	3	2	4
Revenue Increases [improved collection of taxes, fess, fines, insurance claims, etc.]	191	8	8	4	2	2	2	3
Reduction in Duplication and Redundancy	168	18	15	6	8	3	1	2
Asset Management	183	13	7	9	2	5	0	0
Support for Economic and Business Development Initiatives	190	12	6	3	2	2	2	1
Avoidance of New Costs	175	12	14	8	6	0	1	1
Savings in Capital Project Design	183	6	11	7	4	2	3	2
Savings in Infrastructure Maintenance and Design	184	7	11	7	3	1	3	2
More Effective Management/Allocation of Field Services	160	17	16	14	4	2	3	2
Reduced Costs Through Joint Funding	177	4	12	6	6	6	3	3
Other	131	1	0	1	0	0	0	1

The range of financial benefits can be converted to an estimated value by using the mid-point of the range to get an approximation of the total value of the benefits received. Table 3 demonstrates the approximate value reported through the use of orthoimagery. Using this methodology the reported financial benefits to survey respondents exceeds $12.4 million per year.

Table 3. Total Tangible Benefits from using Orthoimagery

Value of Benefits over 5 years	$1 to $9,999	$10,000 to $49,999	$50,000 to $99,999	$100,000 to $199,999	$200,000 to $499,999	$500,000 to $999,999	Over $1 million	Response Total
Assumed Benefit for Each Response	***$5,000***	***$30,000***	***$75,000***	***$150,000***	***$350,000***	***$750,000***	***$1,000,000***	
Staff Productivity and Labor Cost Savings	$95,000	$660,000	$975,000	$1,500,000	$1,050,000	$1,500,000	$4,000,000	**$9,780,000**
Revenue Increases [improved collection of taxes, fess, fines, insurance claims, etc.]	$40,000	$240,000	$300,000	$300,000	$700,000	$1,500,000	$3,000,000	**$6,080,000**
Reduction in Duplication and Redundancy	$90,000	$450,000	$450,000	$1,200,000	$1,050,000	$750,000	$2,000,000	**$5,990,000**
Asset Management	$65,000	$210,000	$675,000	$300,000	$1,750,000	$-	$-	**$3,000,000**
Support for Economic and Business Development Initiatives	$60,000	$180,000	$225,000	$300,000	$700,000	$1,500,000	$1,000,000	**$3,965,000**
Avoidance of New Costs	$60,000	$420,000	$600,000	$900,000	$-	$750,000	$1,000,000	**$3,730,000**
Savings in Capital Project Design	$30,000	$330,000	$525,000	$600,000	$700,000	$2,250,000	$2,000,000	**$6,435,000**
Savings in Infrastructure Maintenance and Design	$35,000	$330,000	$525,000	$450,000	$350,000	$2,250,000	$2,000,000	**$5,940,000**
More Effective Management/Allocation of Field Services	$85,000	$480,000	$1,050,000	$600,000	$700,000	$2,250,000	$2,000,000	**$7,165,000**
Reduced Costs Through Joint Funding	$20,000	$360,000	$450,000	$900,000	$2,100,000	$2,250,000	$3,000,000	**$9,080,000**
Other	$5,000	$-	$75,000	$-	$-	$-	$1,000,000	**$1,080,000**
Total 5-year benefit	$590,000	$3,690,000	$5,925,000	$7,200,000	$9,450,000	$15,750,000	$22,000,000	$62,245,000
Annual Benefits	**$118,000**	**$738,000**	**$1,185,000**	**$1,440,000**	**$1,890,000**	**$3,150,000**	**$4,400,000**	**$12,449,000**

3.2 Reported Benefits from Oblique Imagery

The on-line survey of imagery users requested information on the financial benefit from applying oblique imagery. Table 4 identifies the number of responses and range of values provided through survey responses. As with the responses for orthoimagery, the midpoint of these ranges is used to estimate the benefit from this type of aerial imagery. Tables 4 and 5 illustrate the responses and total oblique imagery benefits in excess of $2 million per year.

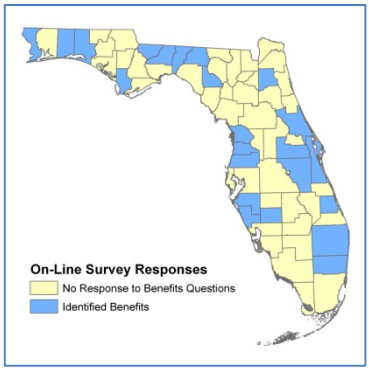
Table 4. Tangible Benefits from using Oblique Imagery

Answer Options	Unknown or N/A	$1 to $9,999	$10,000 to $49,999	$50,000 to $99,999	$100,000 to $199,999	$200,000 to $499,999	$500,000 to $999,999	Over $1 million
Staff Productivity and Labor Cost Savings	53	3	5	3	2	1	1	0
Revenue Increases [improved collection of taxes, fess, fines, insurance claims, etc.]	55	0	5	3	3	0	1	1
Reduction in Duplication and Redundancy	56	3	3	4	2	0	0	0
Asset Management	60	2	1	3	1	0	0	0
Support for Economic and Business Development Initiatives	61	2	2	2	0	0	0	0
Avoidance of New Costs	57	2	5	3	0	0	0	0
Savings in Capital Project Design	59	2	0	3	0	3	0	0
Savings in Infrastructure Maintenance and Design	59	3	0	3	2	0	0	0
More Effective Management/Allocation of Field Services	55	2	6	4	1	0	0	0
Reduced Costs through Joint Funding	55	2	4	4	1	1	1	0
Other	48	0	0	0	0	0	0	0

Table 5. Total Tangible Benefits from using Oblique Imagery

Value of Benefits over 5 years	$1 to $9,999	$10,000 to $49,999	$50,000 to $99,999	$100,000 to $199,999	$200,000 to $499,999	$500,000 to $999,999	Over $1 million	Response Total
Assumed Benefit for Each Response	$5,000	$30,000	$75,000	$150,000	$350,000	$750,000	$1,000,000	
Staff Productivity and Labor Cost Savings	$15,000	$150,000	$225,000	$300,000	$350,000	$750,000	$-	$1,790,000
Revenue Increases [improved collection of taxes, fess, fines, insurance claims, etc.]	$-	$150,000	$225,000	$450,000	$-	$750,000	$1,000,000	$2,575,000
Reduction in Duplication and Redundancy	$15,000	$90,000	$300,000	$300,000	$-	$-	$-	$705,000
Asset Management	$10,000	$30,000	$225,000	$150,000	$-	$-	$-	$415,000
Support for Economic and Business Development Initiatives	$10,000	$60,000	$150,000	$-	$-	$-	$-	$220,000
Avoidance of New Costs	$10,000	$150,000	$225,000	$-	$-	$-	$-	$385,000
Savings in Capital Project Design	$10,000	$-	$225,000	$-	$1,050,000	$-	$-	$1,285,000
Savings in Infrastructure Maintenance and Design	$15,000	$-	$225,000	$300,000	$-	$-	$-	$540,000
More Effective Management/Allocation of Field Services	$10,000	$180,000	$300,000	$150,000	$-	$-	$-	$640,000
Reduced Costs through Joint Funding	$10,000	$120,000	$300,000	$150,000	$350,000	$750,000	$-	$1,680,000
Other	$-	$-	$-	$-	$-	$-	$-	$-
Total 5 Year Benefit	$105,000	$930,000	$2,400,000	$1,800,000	$1,750,000	$2,250,000	$1,000,000	$10,235,000
Annual Benefit	**$21,000**	**$186,000**	**$480,000**	**$360,000**	**$350,000**	**$450,000**	**$200,000**	**$2,047,000**

3.4 Potential Statewide Benefits from Orthoimagery



Survey respondents that provided information on tangible benefits represent only a fraction of the total orthoimagery users in Florida. This is in part due to the difficulty in quantifying benefits in a government setting. For example, 23 of Florida's 67 counties reported tangible benefits from orthoimagery. It is rational to assume that all counties receive similar benefits and the lack of benefits response reflects a lack of information availability rather than the county receiving no benefits. Counties responding represent a cross section of the state in terms of demographics and location. Based on the assumed accrual of benefits across all counties, the per capita value of benefits for counties reporting was calculated and projected across Florida's population. Table 6 identifies the benefits reported by counties and the total population of those counties. The per capita benefits for counties reporting them is then projected to the entire state based on population.

Table 6. Benefits Reported by Counties for Orthoimagery (5 Year Totals)

Benefit Type	Responding Counties Total Population	Responding Counties Total Benefits Reported	Per Capita Benefits
Staff Productivity/Labor Savings	5,944,435	$ 2,195,000	$ 0.3693
Revenue Increase	3,056,636	$ 4,655,000	$ 1.5229
Reduced Redundancy	6,845,873	$ 1,985,000	$ 0.2900
Asset Management	3,089,576	$ 690,000	$ 0.2233
Economic Development	1,169,869	$ 1,440,000	$ 1.2309
Avoid New Costs	2,239,759	$ 1,375,000	$ 0.6139
Capital Projects	4,074,161	$ 1,730,000	$ 0.4246
Infrastructure	4,514,729	$ 2,630,000	$ 0.5825
Field Service Efficiencies	5,032,491	$ 2,425,000	$ 0.4819
Joint Funding	6,631,419	$ 3,325,000	$ 0.5014
Total Per Capita 5 Year Benefit		$ 22,450,000	$ 6.24
Annual Per Capita Benefit		**$ 4,490,000**	**$ 1.25**
Projected Annual Benefit for Entire State	**18,553,974**	**$ 23,157,970**	

The projection suggests that a reasonable expectation for benefits in county governments across Florida of a statewide orthoimagery program is in excess of $23 million per year. Thus the ***potential*** annual benefit to the citizens of Florida from a well run statewide orthoimagery program may range between $12.4 million and $31.1 million. The low estimate of benefits is the

sum of benefits reported by survey respondents. The high estimate builds upon the respondent reported benefits to project benefits to all county government. In both cases the benefit forecast can be viewed as conservative since it does not include potential benefits to private firms and individuals or a larger sampling of non-county governments.

4.0 ORTHOIMAGERY PROGRAM COSTS

Current Florida expenditures from all sources on orthoimagery are difficult to estimate given the diversity of organizations and funding mechanisms in place. At the State level in Florida, the Departments of Revenue and Transportation fund orthoimagery projects. The Department of Revenue uses a model under which private contractors are engaged to collect and process imagery. Working cooperatively with Revenue, the Department of Transportation uses state equipment and human resources to acquire and process orthoimagery. The US Geological Survey through Federal partnership development has contributed grant funds to support statewide collection of orthoimagery. Some of this support has been directed to projects in areas where there is a homeland security requirement driving needs. Additionally many counties support their own imagery programs with locally raised funds.

Table 7 indicates the various funding mechanisms for orthoimagery acquisition over the last several years. Only 27 of the 67 counties submitted information on their total expenditures related to aerial imagery. The average per square mile expenditures for those counties was $142.42. This figure includes not only all costs associated with acquisition and processing but also quality control and image distribution.

Assuming these counties are representative of the entire state, and approximately 1/3 of the state is collected on an annual basis, the approximate annual expenditure for orthoimagery by counties would be $3,112,846[2]. Several urban counties collect imagery on an annual or bi-annual basis and a number of non-county entities also collect imagery.

The total expenditure on orthoimagery and related efforts in the state, when this county projection is combined with other government entities ($3,631,500) and private firms ($1,355,000) the potential expenditure on an annual basis *may* exceed $8 million. This figure includes aerial imagery that is acquired for small areas or for specific purposes that may not be fully compatible with the needs of a statewide imagery program. Examples of this type of small area or specific purpose project acquisition include corridor analysis, leaf on acquisition to support environmental characterization, and oblique imagery supporting property tax appraisal efforts.

All costs associated with acquisition, processing, QA/QC, and distribution of 12 inch orthoimagery can be expected in the $120-130/square mile range based on recent contracts for acquisition and processing. Thus a robust program of orthoimagery could be supported in

[2] This estimated annual expenses for orthoimagery is based upon the assumption that $142.42 is a representative cost currently being paid per square mile for acquisition, processing, QA/QC, and distribution. If 1/3 of Florida's 65,785 square miles (or 21,900) are collected annually the total expenditure would be $3,075,582. [Calculation is (65,785 square miles/3) X $142.42 per square/mile = $3,112,846]

Florida for between $2.6 and $3.1 million per year. This level of funding will support a program that acquired, processes, QA/QCs, and distributes imagery for 1/3 of the state per year. The high end of this estimate would include some value added acquisition services including 6 inch imagery in dense urban areas.

Table 7. County Imagery Status and Funding Partners

County	Year Flown	Funded Project	Acquired and Processed
Alachua	10-11	County	Private
Baker	10-11	DOR	Private
Bay	09-10	County	Private
Bradford	08-09	DOR	Private
Brevard	11-12	DOR	DOT
Broward	11-12	County	Private
Calhoun	09-10	DOR	Private
Charlotte	10-11	SWFWMD/Federal	Private
Citrus	10-11	SWFWMD/Federal	Private
Clay	10-11	DOR/Federal	DOT
Collier	11-12	County	Private
Columbia	09-10	County	Private
DeSoto	10-11	SWFWMD/Federal	Private
Dixie	09-10	DOR	Private
Duval	10-11	DOR/Federal	DOT
Escambia	09-10;	DOR/Federal	DOT
Flagler	10-11	County	DOT
Franklin	09-10	DOR	Private
Gadsden	09-10	DOT	DOT
Gilchrist	09-10	DOR	Private
Glades	11-12	DOR	Private
Gulf	09-10	DOR	Private
Hamilton	09-10	DOR	Private
Hardee	10-11	SWFWMD/Federal	Private
Hendry	10-11	DOR	Private
Hernando	10-11	SWFWMD/Federal	Private
Highlands	10-11	DOR	Private
Hillsborough	10-11	SWFWMD/Federal	Private
Holmes	11-12	DOR	Private
Indian River	11-12	DOR	DOT
Jackson	09-10	DOT	DOT
Jefferson	09-10	DOT	DOT
Lafayette	09-10	DOR	Private
Lake	10-11	DOR	DOT
Lee	10-11	County	Private
Leon	09-10	County/Federal	Private
Levy	10-11	DOR	Private
Liberty	09-10	DOR	Private
Madison	09-10	DOR	Private
Manatee	10-11	SWFWMD/Federal	Private
Marion	10-11	DOR	DOT
Martin	11-12	DOR	DOT
Miami-Dade	11-12	DOR	Private
Monroe	11-12	DOR	DOT
Nassau	10-11	DOR/Federal	DOT
Okaloosa	09-10	DOT	DOT
Okeechobee	11-12	County	Private
Orange	11-12	County	Private
Osceola	10-11	County	Private
Palm Beach	11-12	County	Private
Pasco	10-11	SWFWMD/Federal	Private
Pinellas	10-11	SWFWMD/Federal	Private
Polk	10-11	County	Private
Putnam	10-11	DOT	DOT
Santa Rosa	09-10	DOT/Federal	DOT
Sarasota	10-11	SWFWMD/Federal	Private
Seminole	11-12	DOR	Private
St. Johns	10-11	DOR/Federal	DOT
St. Lucie	11-12	DOR	DOT
Sumter	10-11	SWFWMD/Federal	Private
Suwannee	09-10	County	Private
Taylor	09-10	DOT	DOT
Union	10-11	DOR	Private
Volusia	11-12	DOR	DOT
Wakulla	09-10	DOT/Federal	DOT
Walton	09-10	DOT	DOT
Washington	11-12	DOR	Private

The following counties are designated USGS/DHS Priority Areas and federal partnership funds may be available for aerial imagery: Broward, Charlotte, Clay, Duval, Escambia, Hillsborough, Lake, Lee, Leon, Manatee, Miami-Dade, Nassau, Orange, Palm Beach, Pasco, Pinellas, Santa Rosa, Sarasota, Seminole, St. Johns, Wakulla. Federal support through USGS partnership funds may also be available to support statewide orthoimagery programs.

5.0 OBLIQUE IMAGERY PROGRAM COSTS

At the present time the cost for acquisition of oblique imagery is very difficult to estimate. Seventy (70) survey respondents indicated their organization is currently using oblique imagery. Of those only thirty four (34) provided a response to the question of the annual investment in this imagery. Table 8 demonstrates the total expenditure reported on these data.

Table 8. Annual Investment in Oblique Imagery

Annual Investment in Oblique Imagery and related coats	Responses	Range Mid-Point	Sub-total
Less than $10,000	11	$ 5,000	$ 55,000
$10,001 to $20,000	2	$ 15,000	$ 30,000
$20,001 to $50,000	6	$ 35,000	$ 210,000
$50,001 to $100,000	5	$ 75,000	$ 375,000
$100,001 to $150,000	6	$125,000	$ 750,000
$151,000 to $200,000	1	$175,000	$ 175,000
$200,001 to $300,000	3	$250,000	$ 750,000
$300,001 to $400,000	0		$ -
Greater than $400,000	0		$ -
Total Investment	34		$ 2,345,000

It is unclear from the information provided in the survey the extent of oblique imagery collected. In some cases only the urbanized built up area of a county may have been collected while in other cases an entire county may be available. Additionally, since the marketplace for oblique imagery is dominated by a single vendor at this time there may be little competitive pressure on that vendor to be price sensitive