

Mapping of Coastal Regions for CCCL General Permitting

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Abstract: Evaluation of regions along the Florida coast for application of General Permit (GP) provisions for coastal construction control line (CCCL) permitting has been performed for 3 of the 4 regions defined as part of the regional coastal monitoring program in Florida. The GP provisions can be summarized in simple terms. First, the GP provisions are applied in locations which have low potential for adverse impact; locations where beach-dune impact will not be significant. Secondly, the GP provisions are applied in locations not threatened by erosion; ie, locations landward of 30-yr erosion projection limits, including areas with long-term beach nourishment projects in place. Thirdly, the GP provisions result in simplified, streamlined CCCL permitting, with reduced information submittal requirements and turnaround time, and include SFD and other major non-habitable structures (MFD structures not included).

INTRODUCTION

Specific statutory (Section 161.053(19), F.S.) and administrative rule (Chapter 62B-34, F.A.C.) authorization set forth the basis for GP establishment and administration. Initial criteria for designating areas for GP application were enumerated in rule and based on uniform setback distances for statewide application and were not based on any particular site-specific evaluations. Site-specific evaluations of successive coastal regions by the Florida State University, Beaches and Shores Resource Center (BSRC), have used three substantive criteria, and have not included the initial, generalized setback-type criteria.

The three criteria used in the site-specific evaluations for determination of acceptability for GP application included: 1) acceptable limits of beach and dune impact, 2) acceptable line of construction conformity, and 3) acceptable shoreline stability (or low erosion) conditions. These three criteria are consistent with basic construction siting criteria already contained within Section 161.053, F.S., and Rule 62B-33, F.A.C. Determinations of acceptable limits of beach and dune impact and conformity with a definable line of construction are based largely on subjective site-specific evaluations supported by current site-specific coastal data. Consistent with statute and rule, no GP-associated construction areas are established which encroach seaward of rule-based 30-year erosion projections.

The GP mapping process has been performed on a regional basis. Up-to-date topographic survey data and aerial photography has been obtained for each regional evaluation through the regional coastal monitoring database (RCMD) program of the FDEP Bureau of Beaches and Coastal Systems (BBCS). A map illustration depicting the monitoring regions is shown in Figure 1.

The initial GP mapping was conducted for the Northeast Florida region in 2004-2005, followed by the NW region in 2005-2006, and SW region in 2006-2007. The regional GP evaluations and mapping provide the BBCS with a more site-specific basis for GP application, although the existing rule criteria can still be applied on a case-by-case basis in areas which were not included in the new regional GP designations.

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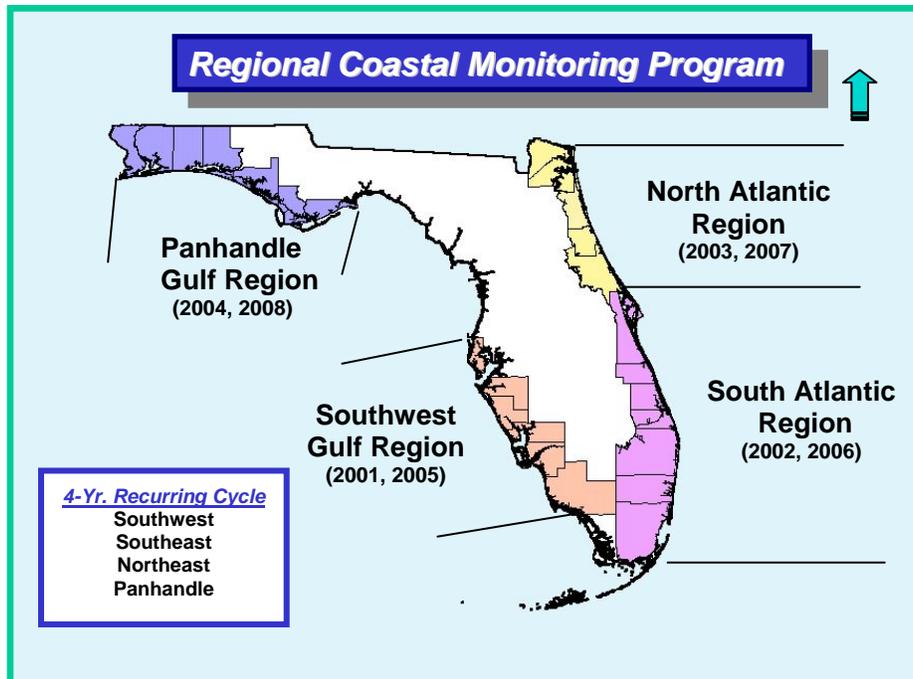


Figure 1. Depiction of FDEP-BBCS Regional Coastal Monitoring Program regions.

BACKGROUND

By way of background, the General Permitting provisions were adopted by Florida Statute in 1996; strangely, somewhat an outgrowth of response to Hurricane Opal in 1995 as a means of reducing overall statewide permitting workload by simplifying (and accelerating) CCCL permits for low-impact construction which met FDEP-BBCS design standards.

A fairly long time gap occurred before the FDEP-BBCS set forth a process and procedure to implement the GP through rule, originally adopted in March of 2003, and referred to now by BBCS staff as "1st generation GP". This rule (62B-34), among other things, adopted a statewide uniform, standard set of siting criteria for GP application to then be applied on individual sites essentially at the time of development.

A so-called 2nd generation effort, the primary focus of this paper, began in 2004 to perform more detailed, site specific evaluation and mapping, rather than applying a standard set of criteria, and performing the evaluation and mapping comprehensively on a county-by-county and regional basis. The first rule revision to incorporate 2nd generation GP work was adopted in November 2005 to include GP lines for the NE region of Florida.

The siting criteria defined in the 1st generation GP rule are essentially as follows:

Qualifying development is required to be, at minimum

- 1) 25 feet landward of the primary dune or armoring structure,
- 2) 50 feet landward of top of dune bluff location,
- 3) 100 feet landward of vegetation line,
- 4) 250 feet landward of MHWL or ECL,
- 5) at or landward of line of construction (note: specifically cited in GP statute),
- 6) at or landward of 30-year erosion projection (note: specifically cited in GP statute)

The first four siting criteria listed above all relate to siting of construction and protection of the beach-dune system, with ultimately the most landward of these being the determining criteria with regard to approval of GP authorization. Application of these criteria can result in a fairly tedious effort to check each one in order to locate a GP line on each individual property at the time of a construction project to determine if a GP may be applied or not. The last two siting criteria listed above are specifically defined in the GP statute provision, as noted above.

REGIONAL MAPPING OF GENERAL PERMIT AREAS

The approach adopted for the 2nd generation GP work is to perform evaluations and line designations for GP areas on a regional basis. The GP regional work has been performed in a sequence which consists of following behind the BBCS regional coastal monitoring data collection work by one year. This allows for completion of new data collection and QA/QC review of that new data for a given region prior to performing the GP work in that region. Both the monitoring program data collection and the GP work are completed for one of the four regions each year.

In terms of the regional GP evaluation and mapping procedure, there are a series of activities or steps that are performed in order to conduct an efficient, streamlined process, but also to perform sufficient detail analysis and mapping in the areas favorable for GP application. Within a given region, the GP evaluation and mapping is performed on a county-by-county basis.

The initial step performed is to conduct overview-type screening of each individual county as work in that county is performed. This includes mapping of general land-use types along the coast for that county, specifically to identify public or other large undeveloped lands, as well as, development types (e.g., single-family dwellings, multi-family dwellings, etc.) in order to exclude non-applicable areas and focus only on specific areas of potential GP application. This general land-use evaluation also includes mapping, to the extent possible, of locations of coastal armoring.

Illustrative maps of the general coastal land use are prepared by BSRC-GIS staff for each county under evaluation. An example of one of these land use maps, for Nassau County, is shown in Figure 2 below. Initial aerial photomaps of each county are prepared as GIS base maps for the GP mapping. A final part of the initial screening step is to conduct screening review meetings with experienced BBCS regulatory staff to review the initial mapping and tabulate the areas within the county which warrant detailed evaluation vs. areas which clearly are not favorable for detailed evaluation and mapping. This final screening is very important in minimizing time and effort spent on evaluation and mapping in the non-favorable areas.

The second major step in the GP procedure is to conduct a review of what is referred to as “GP Qualifying-Area Characteristics”. This consists of essentially identifying and mapping of critical erosion areas, as defined by BBCS, for related background informational purposes, and erosion control projects, primarily as it relates to their influence on the long-term erosion projections. These areas and projects are included in illustrative map series prepared for each county as part of the report documentation. An example map is shown in Figure 3. Documentation regarding the specific locations and lengths of the erosion control projects are included in the GP reports.

The next step in the GP procedure is to perform the detailed, site-specific evaluations and mapping work. As described above, this detailed work is predominantly focused on the areas

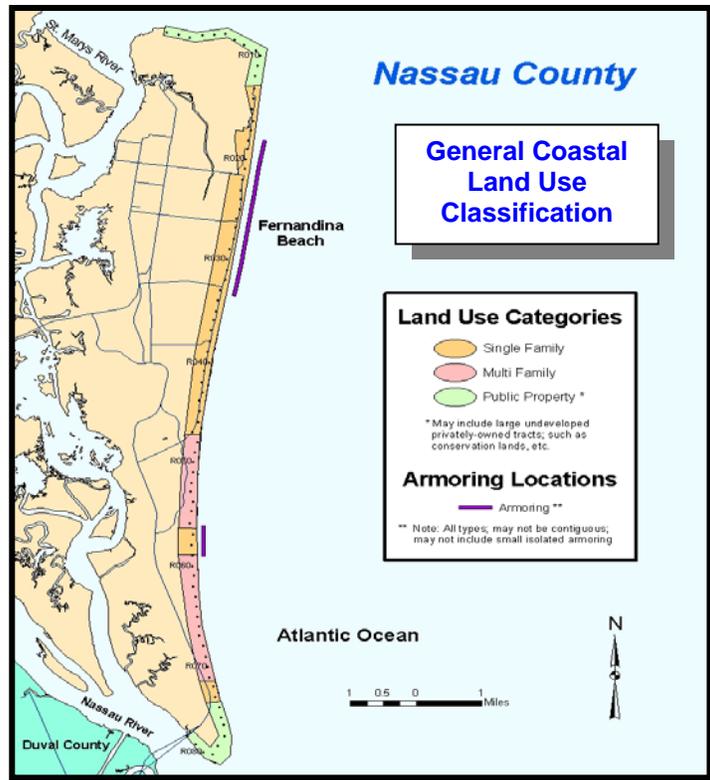


Figure 2. Example of illustrative map of general coastal land-use for Nassau County.

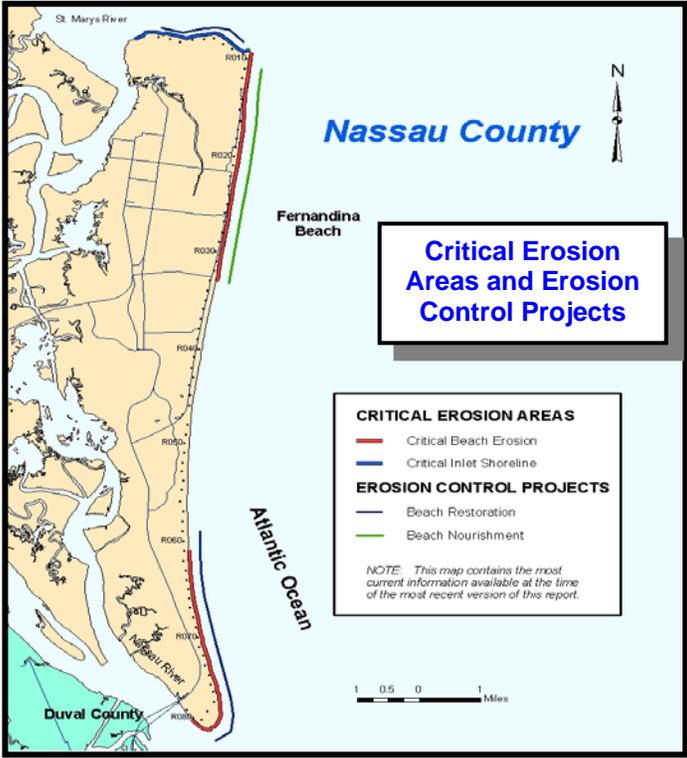


Figure 3. Example of illustrative map of qualifying-area characteristics for Nassau County.

identified in the initial screening step as favorable for GP application. The detailed evaluation procedure is based on the three criteria listed in the introduction on page 1 above, which are essentially the same as those defined by rule and used for the 1st generation GP. However, the major difference is that the 1st generation siting criteria (1-4 listed at the bottom of page 2 above) have been simplified into one, more general criterion related to “protection of the beach-dune system”. This criterion has been, for many years, and continues to be, one of the primary regulatory criteria applied in the CCCL regulatory program, as set forth in statute.,.

The more detailed 2nd generation GP evaluation and mapping on the county-by-county, regional basis has allowed for, in effect, “over-riding” the 1st generation siting criteria and, instead, performing a more thorough, though possibly more qualitative, review of beach-dune conditions throughout a given county. The 2nd generation work is performed in a comprehensive manner allowing for GP mapping throughout each county and region in their entirety and, subsequently, defining of GP lines across those broad areas, rather than addressing a given property individually in a more reactive manner each time a permit application is reviewed.

The comprehensive evaluations, in terms of the beach-dune system impact criterion, are conducted through use of the data and information obtained through the BBCS regional coastal monitoring program, as well as, extensive knowledge of coastal conditions by experienced BSRC and BBCS staff engineers. Regional data and information used by staff include high-resolution aerial photography, ground and air-borne laser (LiDAR) topographic survey data, and aerial videography, as needed. In applying this criterion, GP lines are designated only in locations where potential or expected impacts to the beach-dune system will not be significant.

The line of construction (LOC) criterion is greatly affected by local planning and zoning and, indirectly, from the BBCS point of interest, relates to protection of the beach-dune system by limiting advancements of determined lines of construction. Many local coastal governments and communities have adopted the State of Florida’s original coastal construction setback lines (CCSBLs; precursors to the CCCLs) as their local setbacks, many of them in effect for long periods of time (e.g., +/-30 years). As such, many of the CCSBLs provide clearly-defined lines of construction within these areas and were subsequently used as LOCs for the GP work.

In some locations, despite relatively uniform and consistent LOCs, landward offset buffer lines, usually 25 feet, were applied to ensure dune system protection and to reduce potential for advancement of LOCs. In locations with less uniform LOCs, landward offset distances were increased accordingly.

The other major review criterion applied in the 2nd generation GP evaluation work relates to shoreline (mean high water; MHW) stability through determination of long-term erosion rates and 30-year erosion projections. As mentioned, this analysis requirement is directly set forth in the GP statute provisions. In the initial GP work, BSRC staff applied two different methods of determining the shoreline change rates and 30-year projections.

One evaluation method is consistent with and applicable to procedures described in Rule 62B-33.024, F.A.C., as followed by BBCS in all coastal construction control line regulatory reviews (herein referred to as the “rule-based” 30-yr. erosion projection). More information on the rule-based 30-year erosion projections are contained in papers/reports by Foster (1992, 2004, 2005).

The other method performs a least-squares trend analysis utilizing all available historic shoreline data in the erosion computations and includes a stochastic component to account for vulnerability/susceptibility to high-frequency storms and/or beach fluctuations (herein referred to as the “trend/stochastic” 30-yr. erosion projection). More information on the trend/stochastic 30-year erosion projections is contained in a report by Walton and Cheng (2004).

The BBCS decided to include both methods in the GP evaluation work, although the trend/stochastic method is used more as a general reference guide, while the rule-based method is more definitively used for the GP line mapping and takes into account coastal armoring and beach nourishment type influences. This type of regional 30-yr erosion projection mapping, conducted as a part of the GP evaluation work, has not been performed previously in a comprehensive manner on the State level.

An example of the two different sets of 30-year erosion projections compiled and mapped for Nassau County are shown below in Figure 4.

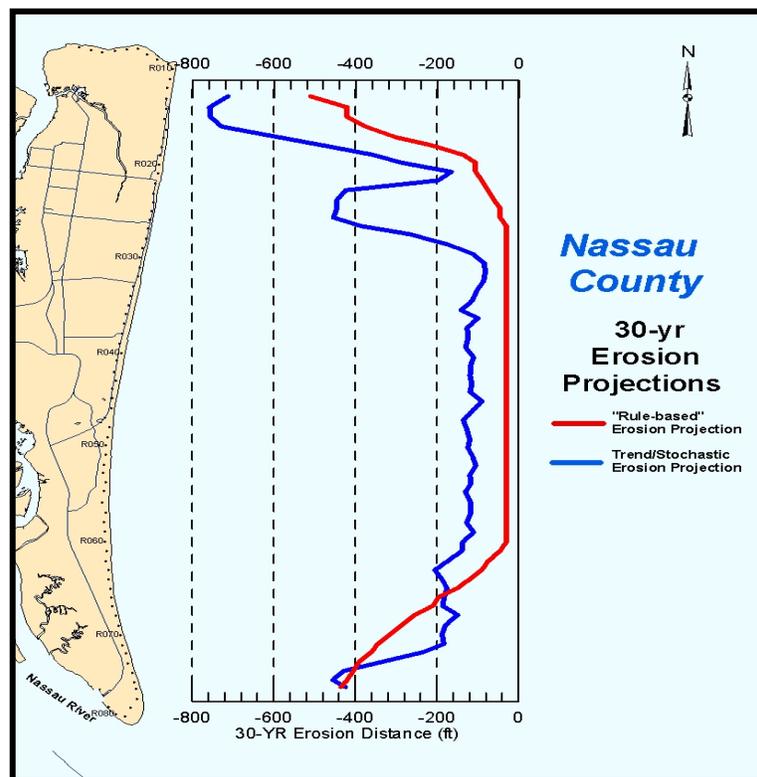


Figure 4. Example of illustrative map of 30-year erosion projections for Nassau County.

Both 30-year erosion projection locations are mapped onto GIS-based aerial photomaps, along with locations of the MHW, seasonal high water (SHW), FDEP survey range point locations and profile lines, coastal armoring, as well as, the CCSBLs and associated landward offset buffer lines, and the CCCLs. An example of an annotated aerial photomap used in the GP evaluation work for a location in Nassau County is shown in Figure 5. Contour map layers from LiDAR survey data are generated and added to the aerial photomaps, as needed, to assist in evaluation of beach–dune system conditions.

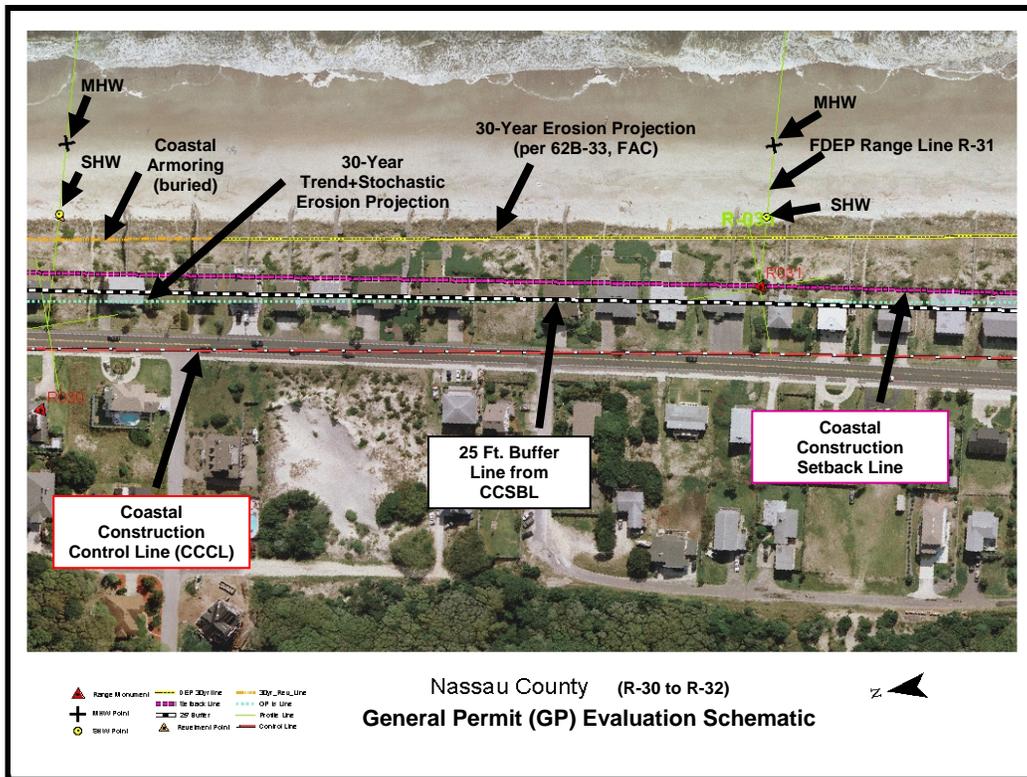


Figure 5. Example of annotated GP aerial photomap for location in Nassau County.

Supporting information generated from the GP work includes a methodology/procedural report, a series of regional report volumes with county-specific sections, a standardized illustrative map series, and a set of annotated GP aerial photomaps (GIS-based) for all counties within each region.

Several examples of aerial photomaps are shown below in Figures 6 through 9 which demonstrate various conditions favorable to GP line designation. In Figure 6, a GP line is shown which follows the CCSBL in one segment of Jacksonville Beach and then transitions very consistently along a 25 ft buffer landward of the old setback line to the south. This location contains extensive coastal armoring and a beach restoration project controlling erosion.

A GP line is shown in Figure 7 for an area in St. Augustine Beach which is also armored and within a beach restoration project. Areas such as this where there are multiple lines or rows of development contain favorable conditions for GP line designation. A similar condition of multiple rows of development is shown in Figure 8 for a location in Mexico Beach in Bay County. One more example of favorable GP conditions is seen in Figure 9 at a location on Sanibel Island in Lee County, where, again, a very consistent line of construction aligns with the old CCSBL; plus, the shoreline is stable and there is an extensive setback of development from the shoreline.

The final procedural step in the GP evaluation process is to physically map the GP line for the county under evaluation. Tabulations of erosion rates, 30-year erosion projections, general coastal land-use classification, and GP location information are included in the GP report documentation, as well as, GP summary information for each county and region. The precise

location of the GP line is defined by a legal description prepared and recorded by a BBBS professional land surveyor.

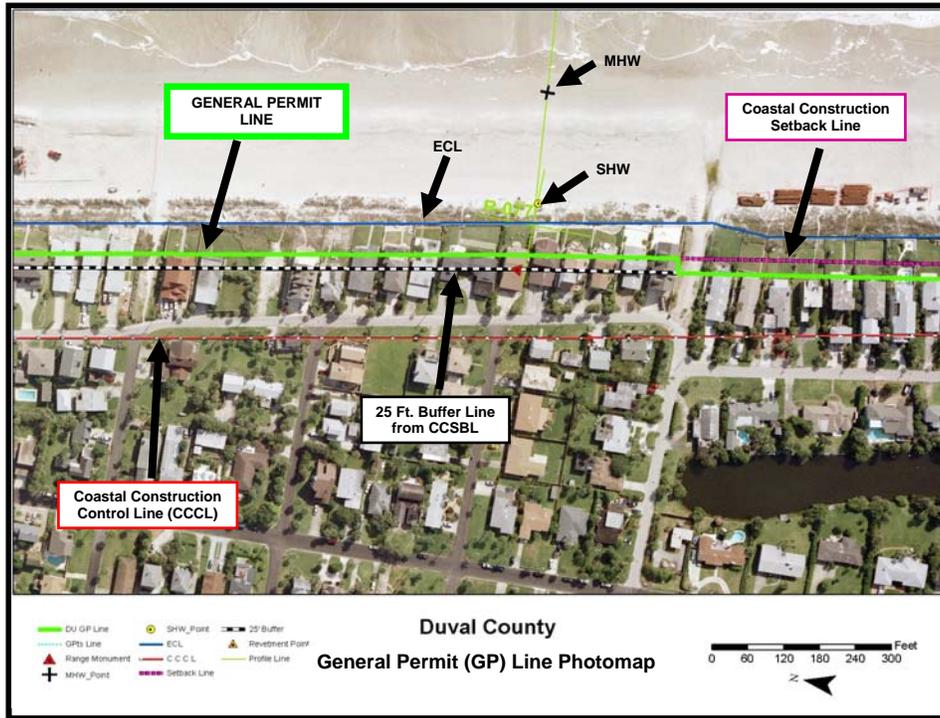


Figure 6. Example of favorable GP conditions in Jacksonville Beach in Duval County.

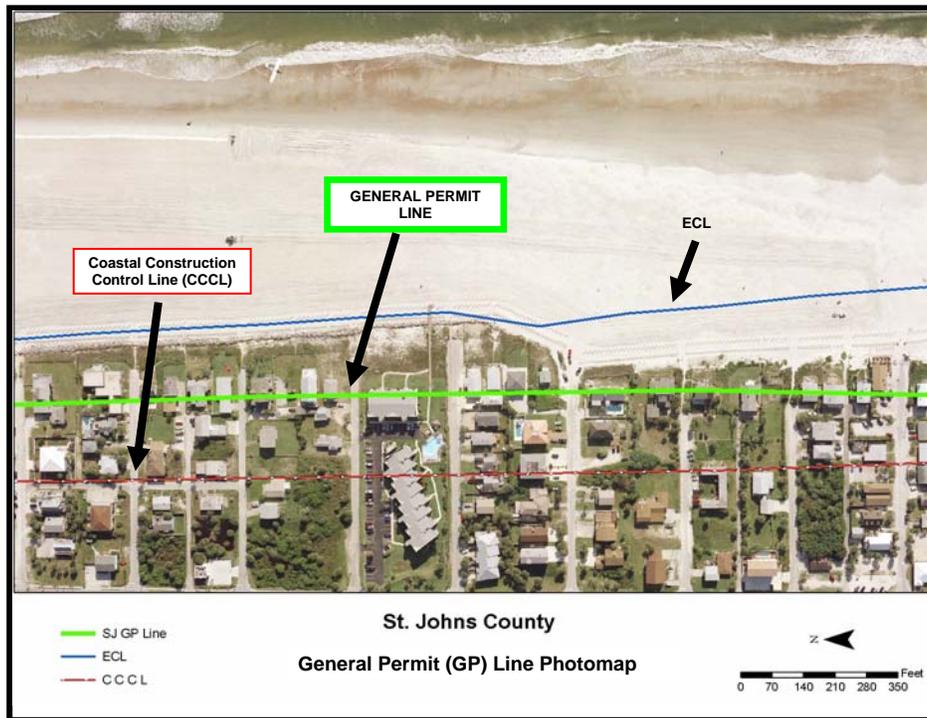


Figure 7. Example of favorable GP conditions in St. Augustine Beach in St. Johns County.

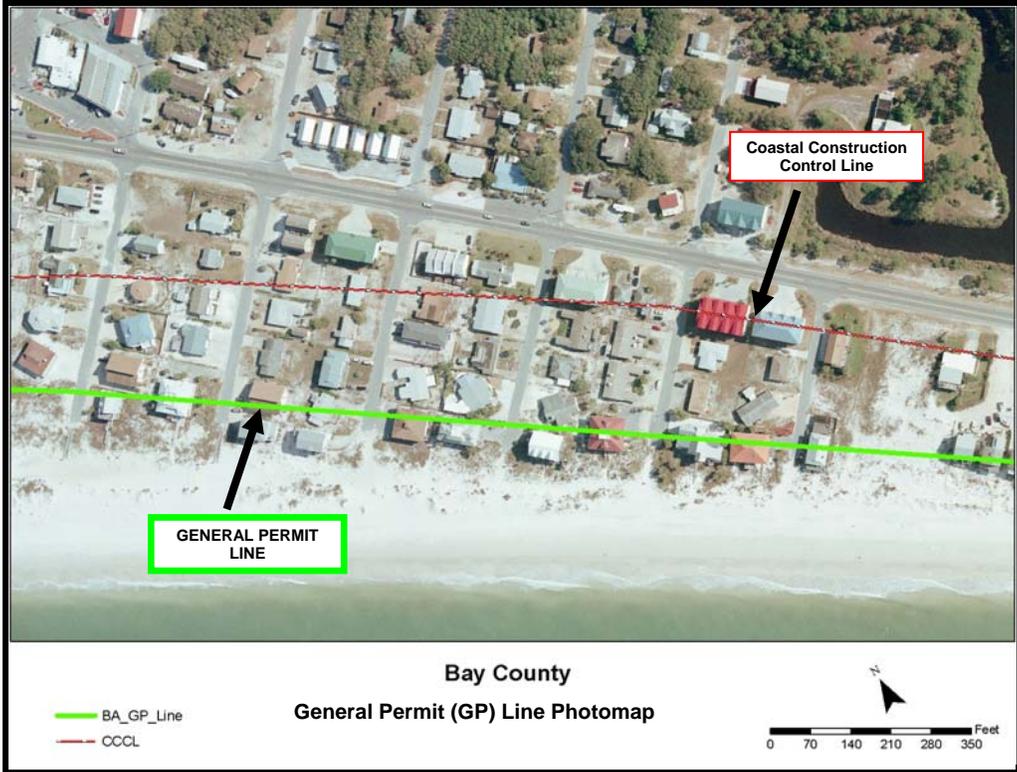


Figure 8. Example of favorable GP conditions in Mexico Beach in Bay County.

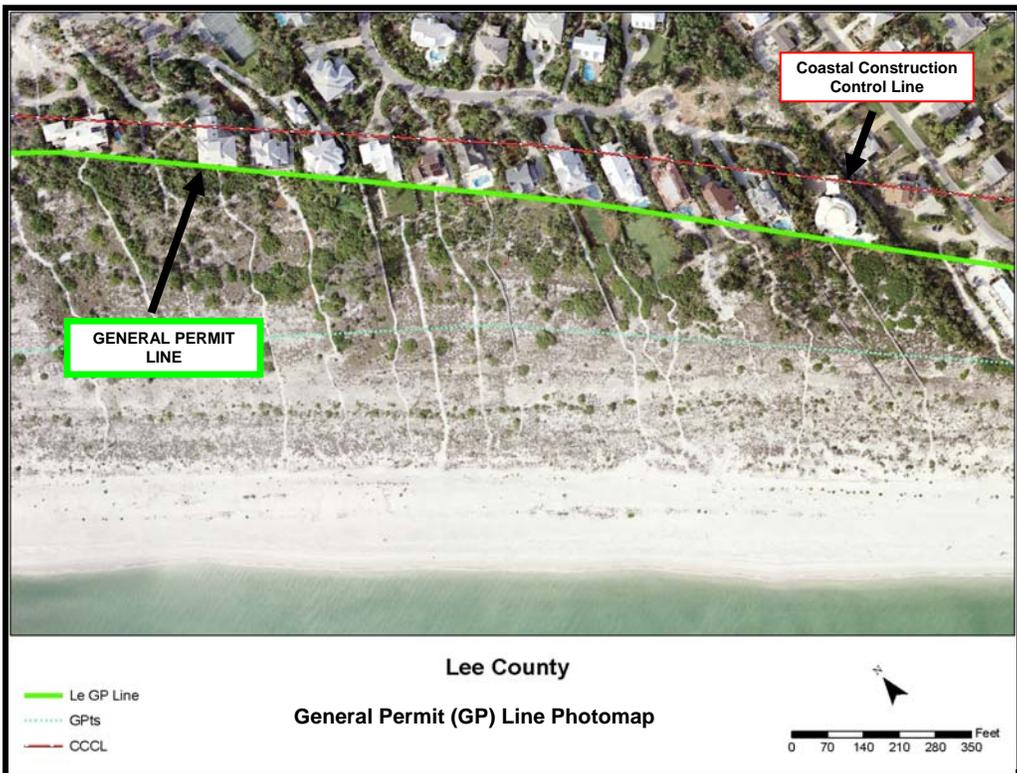


Figure 9. Example of favorable GP conditions on Sanibel Island in Lee County.

Illustrative maps depicting locations of GP lines for counties within the NE, NW, and SW regions are shown in Figures 10, 11, and 12, respectively.

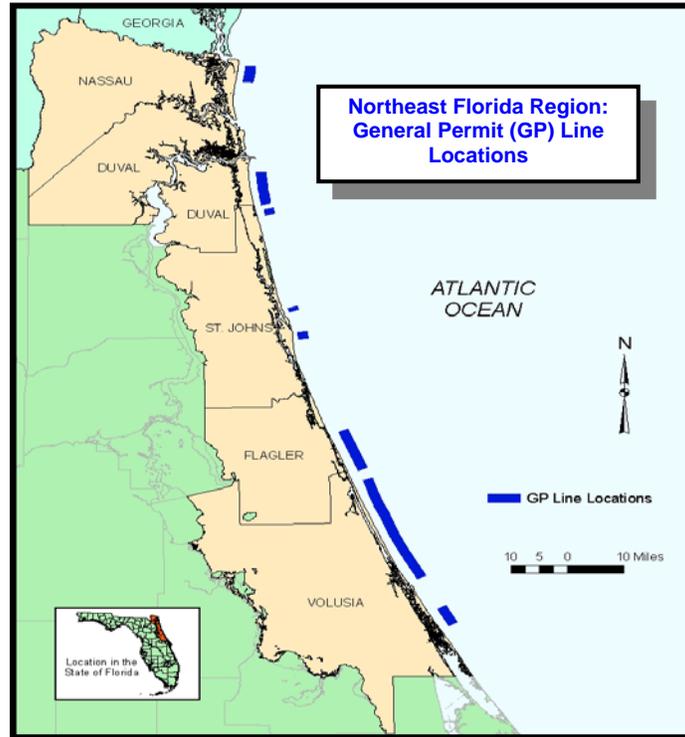


Figure 10. Summary map of General Permit line locations for the NE region.



Figure 11. Summary map of General Permit line locations for the NW region.

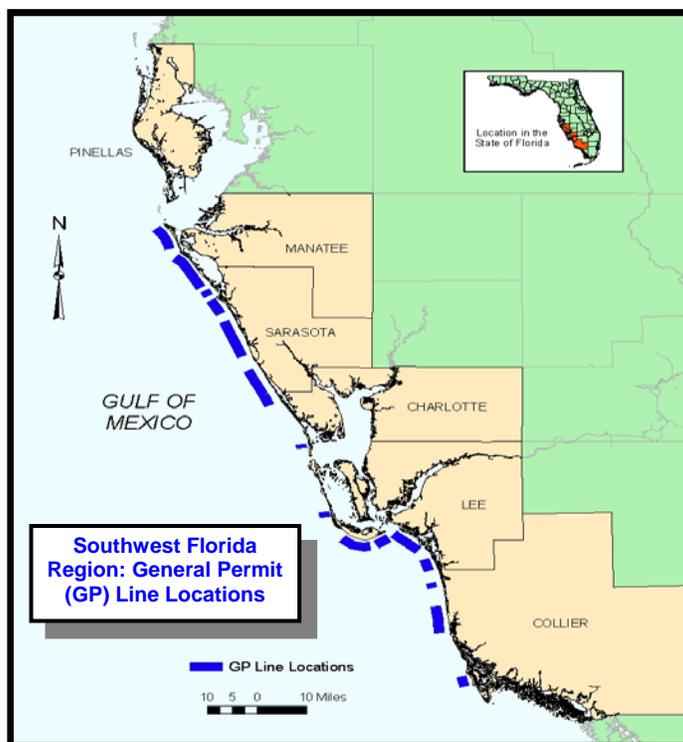


Figure 12. Summary map of General Permit line locations for the SW region.

As shown on the map in Figure 10, Duval and Volusia counties have the highest GP line coverages for the NE region. Results for the NW region, shown in Figure 11, were greatly hindered by recent hurricane impacts in 2004 and 2005. The entire area as a whole was determined to be generally unfavorable for GP implementation at this time. In fact, Santa Rosa, Okaloosa and Walton counties were excluded from GP consideration completely and not included in the evaluation of this region as a result of hurricane impacts. It is noted that this region is undergoing CCCL re-study evaluations for CCCL relocations at this time in response to the recent hurricane impacts. As shown in Figure 12, GP evaluation results for the SW region has shown this region to be the most favorable region for GP line designations of the three region evaluated at the time of this paper preparation.

As an overall summary of the GP work completed for the three regions discussed herein, a series of bar graphs have been prepared to depict the results in Figures 13 through 20. Results in Figure 13 for the NE region can be seen where the blue bar shows total shoreline length for the county, then the tan bar is total length of developed shoreline, and the red bar is the total GP length. As stated above, Duval and Volusia show the greatest GP length; St. Johns the least. The graph shown in Figure 14 shows the percent of GP for the total county length on the blue bar and percent of GP for the developed portion of the county shoreline on the tan bar.

Similar graphs are shown for the NW region in Figures 15 and 16, and for the SW region in Figures 17 and 18. As stated, very little GP is shown for the NW region at this time, while the SW region shows the greatest amount of GP coverage of the three regions evaluated. Graphs shown in Figures 19 and 20 provide comparison of GP evaluation results for all three regions evaluated to date. The graph in Figure 19 includes a hatched portion of the total shoreline length for the NW above the total length evaluated to show the total region length with inclusion of

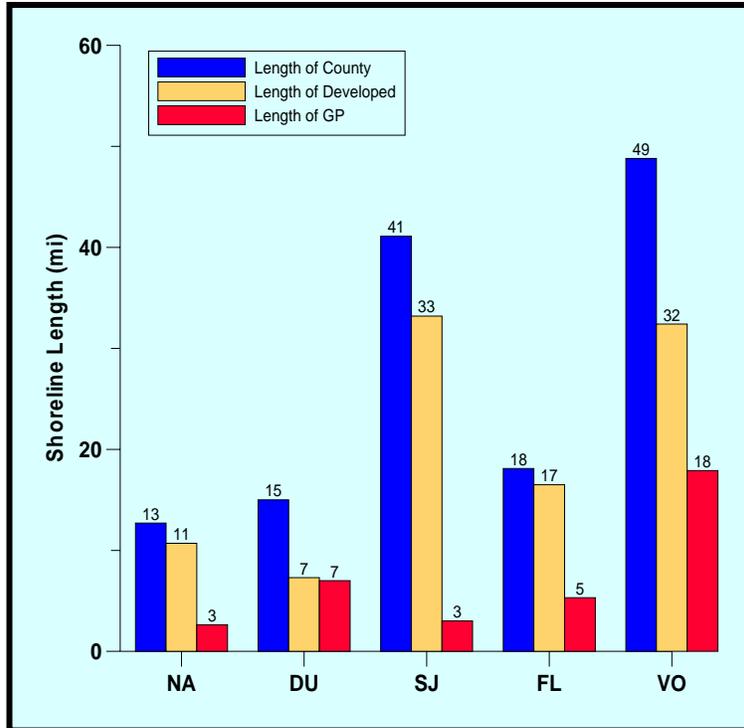


Figure 13. Summary graph of GP line results for the NE region.

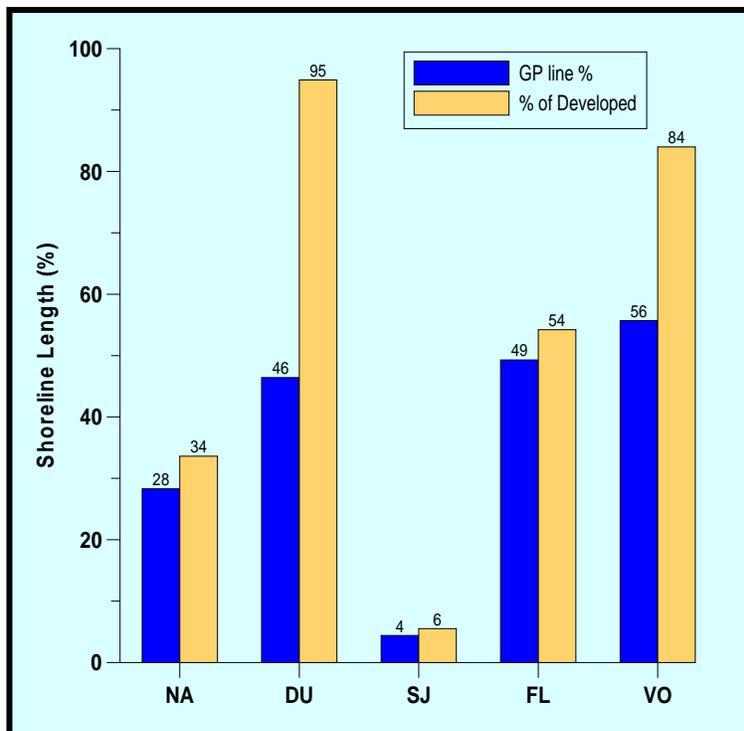


Figure 14. Summary graph of GP line percentage results for the NE region.

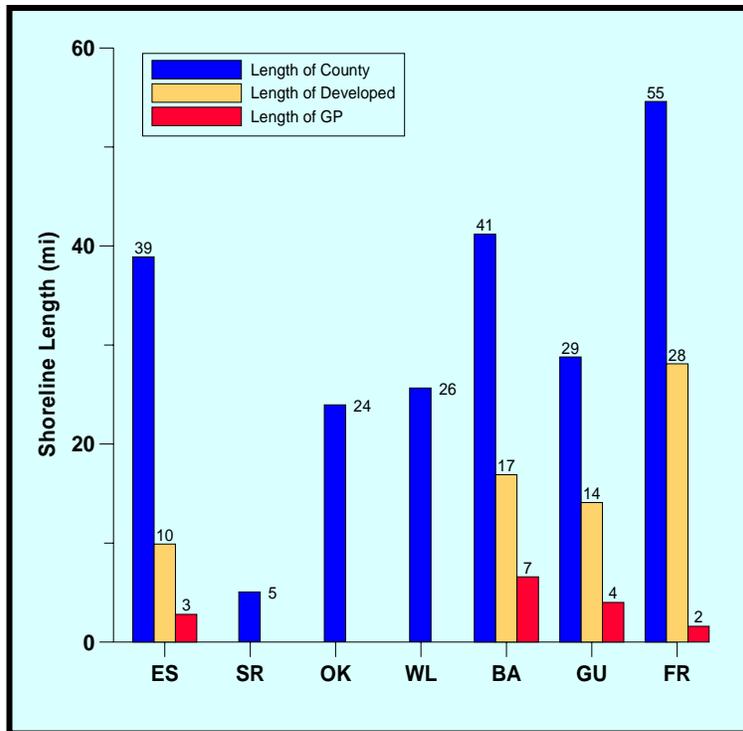


Figure 15. Summary graph of GP line results for the NW region.

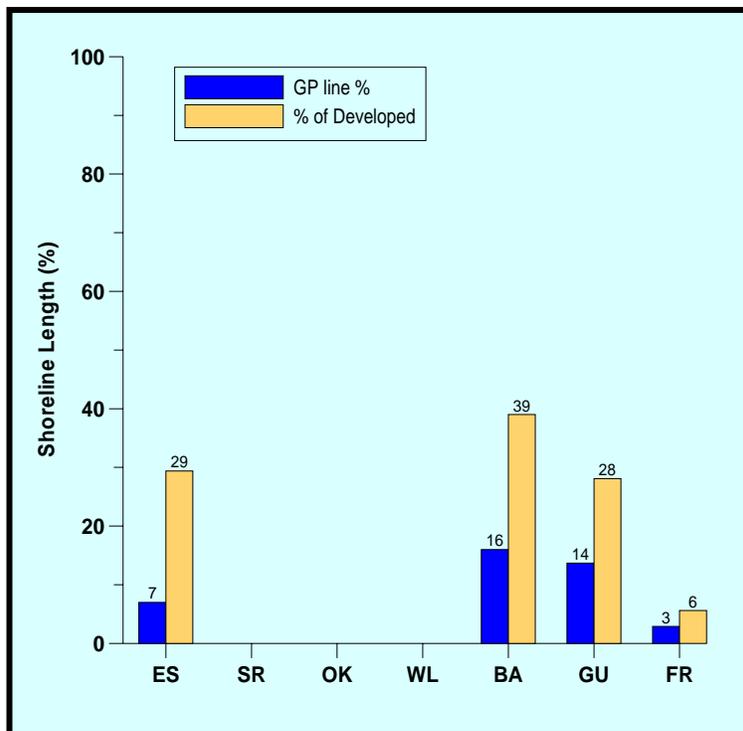


Figure 16. Summary graph of GP line percentage results for the NW region.

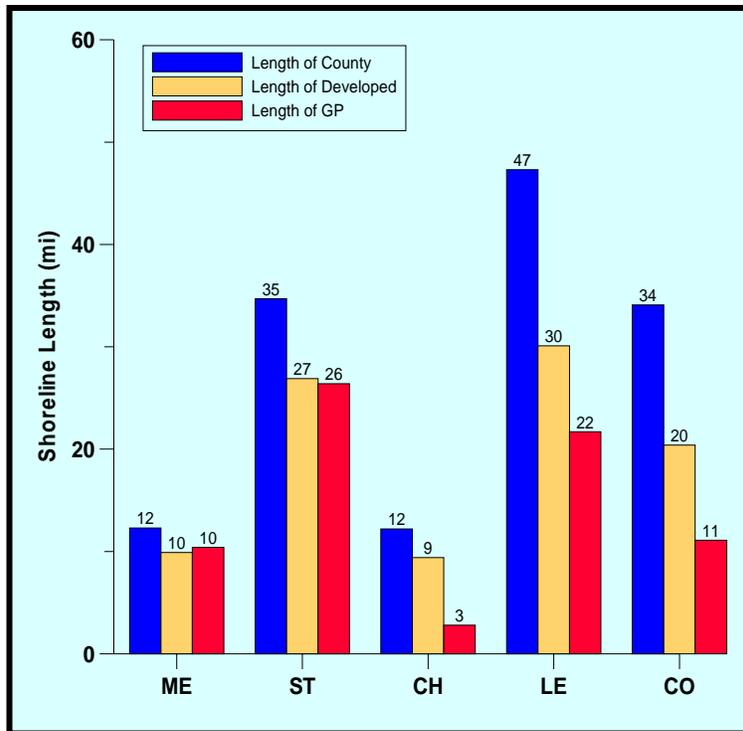


Figure 17. Summary graph of GP line results for the SW region.

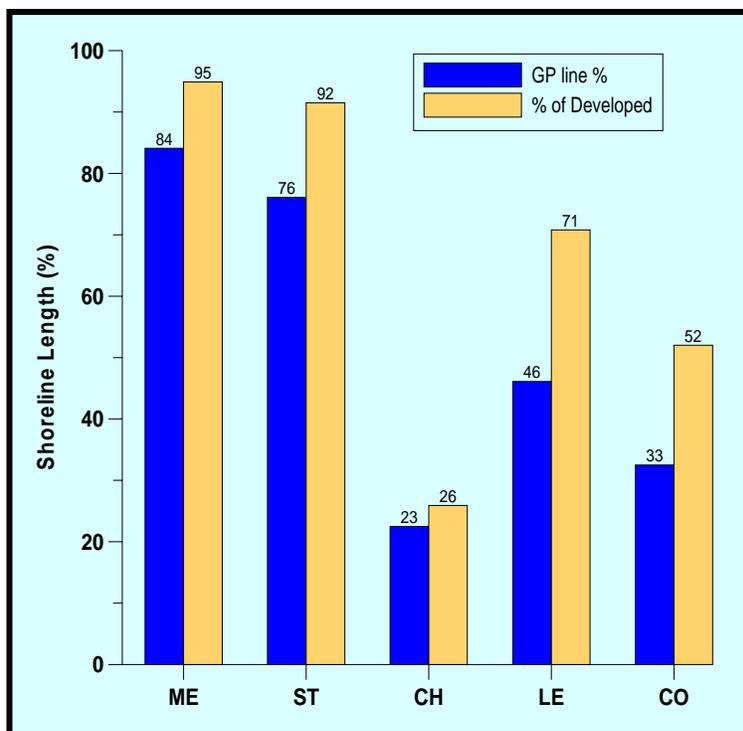


Figure 18. Summary graph of GP line percentage results for the SW region.

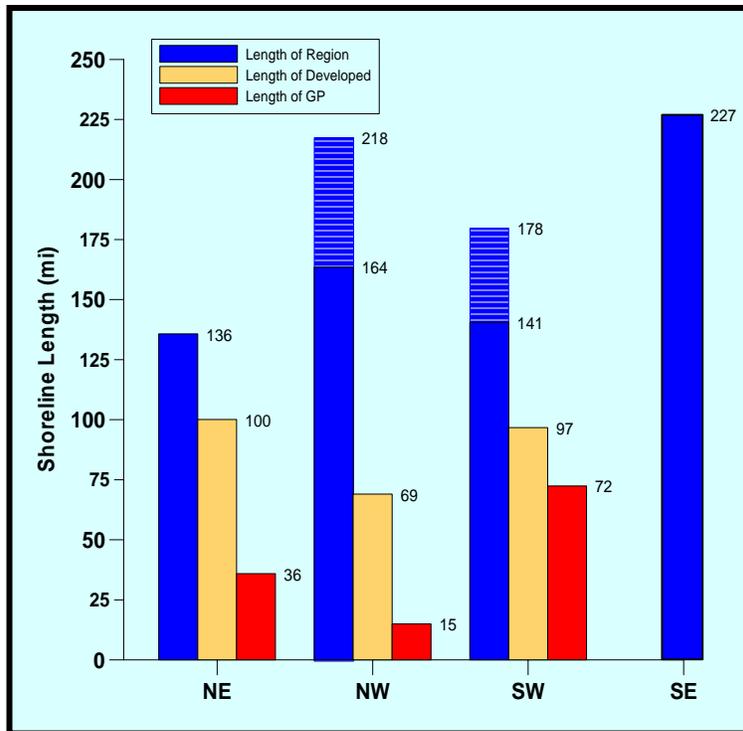


Figure 19. Summary graph of GP line results for the total NE, NW, and SW regions.

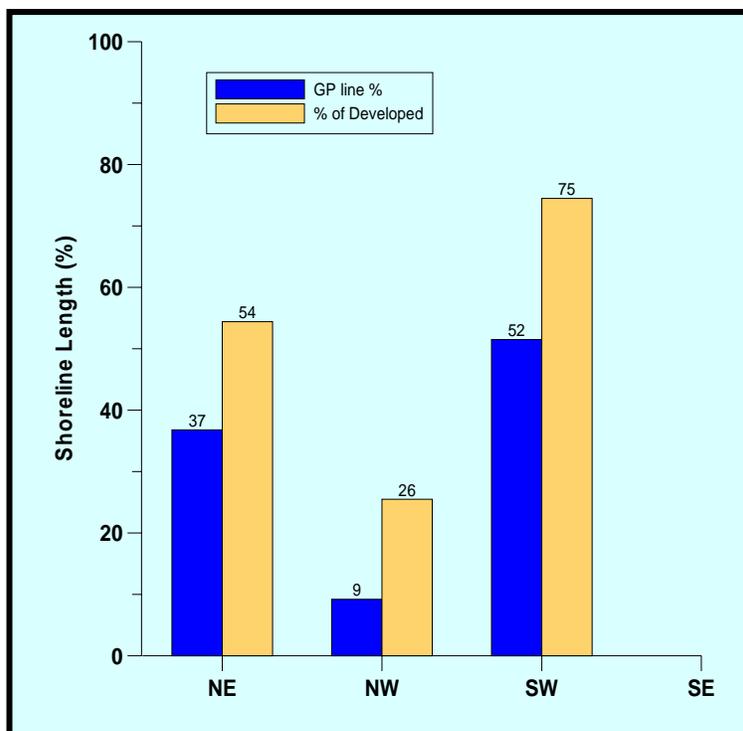


Figure 20. Summary graph of GP line percentage results for the NE, NW, and SW regions.

Santa Rosa, Okaloosa, and Walton counties in order to compare the total shoreline lengths for each region. Also shown as a hatched extension on the total shoreline length for the SW region is the inclusion of the shoreline length for Pinellas County to see the total SW length for CCCL-regulated counties. Pinellas County was considered to be non-applicable for GP application because of the seaward location of the CCCL, which is the original CCCL set for the County.

The GP procedural report and NE regional report are posted on the BBCS website. The website address at the time of this paper preparation is: <http://www.dep.state.fl.us/beaches/> The NW and SW regional reports will be posted following rule revisions to adopt the lines for those regions which should take place during the summer of 2007. Instead of uploading the extensive GP photomap files to the web, GIS coverages of the GP lines have been uploaded to an interactive GIS web-based system already on the BBCS website. The site is known, at the time of this paper preparation, as the Regional Coastal Monitoring Database (RCMD) site with a web address as follows: <http://bcs.dep.state.fl.us/rcmd/> A screen view of the RCMD website is shown in Figure 21 below. An example of the GP line on the RCMD website in St. Augustine Beach is shown further below in Figure 22.

Figure 21. Screen view of the BBCS Regional Coastal Monitoring Database (RCMD) website.

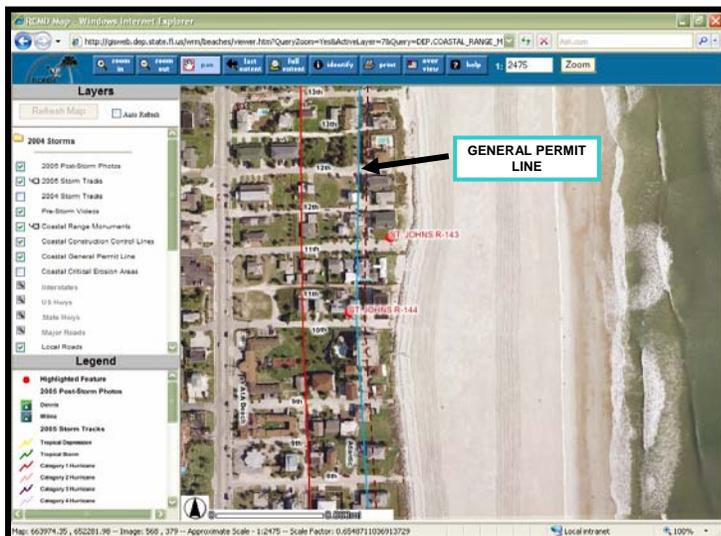
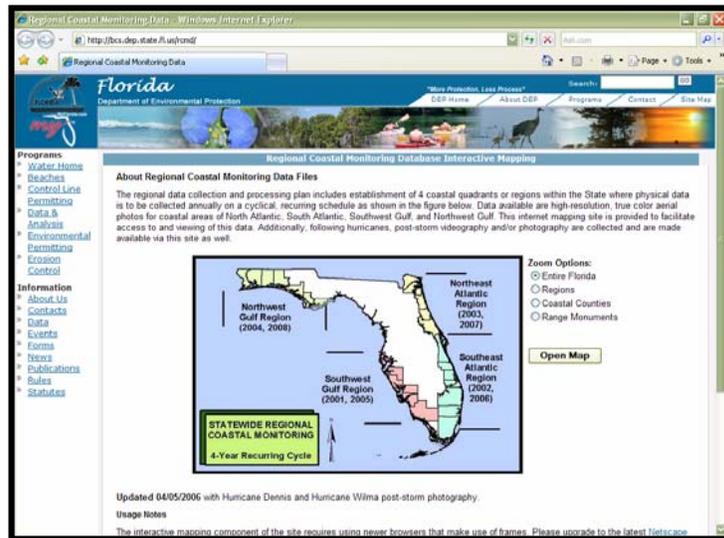


Figure 22. Example of the GP line in St. Augustine Beach on the RCMD website.

CONCLUSIONS

Regional evaluations and mapping of coastal regions of Florida under jurisdiction of the State of Florida's CCCL program have been conducted for determination of locations for General Permit (GP) application as set forth in statute and rule. Specific GP evaluation and mapping has been completed for 3 of 4 established regions, which coincide with the BBCS regional coastal monitoring data (RCMD) collection regions, and include the NE, NW, and SW regions. The SE region is to be completed by early summer of 2008.

GP work has resulted in identification of GP lines throughout portions of the individual counties within these regions to be adopted by rule for implementation by the BBCS in the CCCL regulatory program. GP evaluation and mapping discussed in this paper has been performed in a comprehensive manner with use of the most currently available data obtained through the RCMD program. Evaluation criteria used in this work is a simplified version of the same criteria set forth in the original, or "1st generation", GP rule.

Evaluation and mapping results have shown the SW region to be the most productive region in terms of extent of GP lines identified. GP lines were designated for over half (52%) of the total coastal jurisdictional shoreline in the SW region (excluding Pinellas County), and three-quarters (75%) of the developed portion of that SW shoreline has designated GP lines. The next most productive region is the NE region where over a third (37%) of the total shoreline and over half (54%) of the developed shoreline have designated GP lines. The NW region has been shown to be the least productive of the 3 regions studied to date with only 9% of the total shoreline and 26% of the developed shoreline producing designated GP lines. The low NW values are partially attributable to recent hurricane impacts in 2004 and 2005. The most productive locations for GP lines in the NW region are Pensacola Beach and Panama City Beach, both locations where comprehensive beach restoration projects are in place.

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