

Martin County Vessel Traffic Study

Prepared for:



Florida Fish and Wildlife
Conservation Commission
Division of Law Enforcement, Boating and Waterways Section

Prepared by:



7406 Fullerton Street
Suite 350
Jacksonville, FL 32256

In partnership with



and

Jay Gorzelany

February 4, 2008

Acknowledgements

Project Team

Client: Florida Fish and Wildlife Conservation Commission (FWC), Division of Law Enforcement, Boating and Waterways Section

TARA ALFORD	MANAGEMENT ANALYST
Dieter Iten	Officer
Paul Ouellette	Major
Carol Keyser	Captain
Bill Sargent	Fish and Wildlife Research Institute

Florida Fish and Wildlife Conservation Commission (FWC), Office of General Counsel

Alan Richard	Assistant General Counsel
--------------	---------------------------

Project management: Post, Buckley, Schuh & Jernigan (PBS&J), Coastal and Waterways Division

ROGER ANDERSON	SENIOR PLANNER IV
Janet Allen	Senior Technical Coordinator I
Joy A. Blinn	Planner II
Marie Romah	Project Engineer I
Steve Pophal	Senior Project Manager

Subconsultant: Florida Sea Grant (FSG)

CHARLES SIDMAN	COASTAL PLANNING SPECIALIST
Russell Watkins	Geography Specialist
Robert Swett	Assistant Professor, Fisheries and Aquatic Sciences

Special thanks go to Jay Gorzelany who conducted the quarterly vessel traffic aerial surveys of the Martin County waterways. Also, thanks go to the Martin County marina operators who provided valuable insight on the Martin County waterways and their respective marine facilities operation.

Table of Contents

1.	Introduction.....	1
	Background	1
	Study Goal and Objectives.....	2
	Martin County Waterway.....	2
	Martin County Boat Registration and Population Trends.....	6
	Boating Trend Forecast	11
2.	Data Collection and Inventory of Waterway Features.....	13
	Waterway Inspection and Reconnaissance.....	13
	Marina, Boat Ramp, and Fuel Dock Facility Inventory	14
	Waterway Marker Inventory.....	17
	Vessel Traffic Inventory.....	18
	Review of Boating Accident Reports and Citation Data	25
	Workshops/Meetings with FWC Personnel	26
	Mapping Waterway Features	27
3.	Boating Safety Risk Analysis	38
	Existing studies.....	38
	Evaluation of Section 68D-23.105 (FAC)	40
	Scoring and Weighting of Risk Criteria.....	43
	Association of Risk factors to IWW Segments: GIS Linear Referencing	45
	Composite Scoring of Risk Factors to Identify Risk Levels	46
4.	GIS Model Output.....	48

5. Summary and Recommendations..... 65

 Data Compilation..... 66

 Data Development 66

 Method Enhancement..... 67

 Integration and Training..... 69

DRAFT

List of Figures

Figure 1-1. Martin County Study Area	4
Figure 1-2. Martin County IWW and Navigation Aids.....	5
Figure 1-3. Martin County Public Marinas.....	8
Figure 1-4. Martin County Public Fuel Docks	9
Figure 1-5. Martin County Public Boat Ramps	10
Figure 2-6. Martin County Standard Flight Path (2/22/07 survey flight)	20
Figure 2-7. Snapshot of Video Footage from Aerial Reconnaissance.....	22
Figure 2-8. GIS Depiction of Vessels Locations from Aerial Reconnaissance	22
Figure 2-9. Vessel Traffic Clustering Within Martin County Waterways.....	23
Figure 2-10. Vessel Traffic Clustering: The “Crossroads” Area	24
Figure 2-11. Martin County Bridges and Locks	32
Figure 2-12. Martin County Waterway Obstructed Visibility	33
Figure 2-13. Martin County Waterway Markers.....	34
Figure 2-14. Martin County Reported Boating-Related Accidents	35
Figure 2-15. Martin Boating-Related Citations.....	36
Figure 2-16. Martin County Boating Safety Zones.....	37
Figure 3-17. Boating Safety Risk DSS Conceptualization	43
Figure 4-18. Graphic Output for Waterway Segments in the Stuart "Bridges" Area.....	52
Figure 4-19. Dispersion of Risk Variables by Safety Situation.....	54
Figure 4-20. Focus Area Reference Map	56

Figure 4-21. Jensen Beach Causeway Area 57

Figure 4-22. "Crossroads" Area..... 58

Figure 4-23. Hobe Sound (North) Area 59

Figure 4-24. Hobe Sound (South) Area 60

Figure 4-25. Blowing Rocks Area 61

Figure 4-26. Stuart "Bridges" Area 62

Figure 4-27. South Fork Area 63

Figure 4-28. S.R. 710 Bridge Area 64

DRAFT

List of Tables

Table 1-1. Historic Annual Vessel Registration Data.....	6
Table 1-2. Forecasted 2020 Vessels per 100 People.....	11
Table 1-3. Forecasted 2020 Vessel Registration Data	12
Table 2-1. Martin County Public Marinas	15
Table 2-2. Martin County Public Boat Ramps	16
Table 2-3. Flight Dates, Timing, and the Number of Vessels Observed.....	21
Table 2-4. Boating Accidents and Citations Relevant to an Assessment of Risk.....	26
Table 2-5. Data Themes Assembled for the Vessel Traffic Study	29
Table 4-1. Vessel Collision Risk Variables and Risk Level Estimates by Waterway Segment	49
Table 4-2. Public Safety Risk Variables and Risk Level Estimates by Waterway Segment	50
Table 4-3. Maritime Property Endangerment Variables and Risk Level Estimates by Waterway Segment.....	50
Table A1. Vessel Type Categories.....	72
Table A2. Vessel Size, Activity, and Speed Categories.....	73
Table A3. Summary of Vessel Types Observed via Aerial Reconnaissance (2006–2007)	74
Table A4. Summary of Vessel Size Classes Observed via Aerial Reconnaissance (2006-2007)	75

Abbreviations, Acronyms and Definitions

Atlantic Intracoastal Water (AIWW)

Beaufort Scale (an empirical measure for describing wind velocity mainly on observed sea conditions).

Boating and Waterway Management Program (BWMP)

Decision Support System (DSS)

Digital Orthophoto Quarter Quadrangles (DOQQ)

Environmental Systems Research Institute (ESRI)

Fish and Wildlife Research Institute (FWRI)

Florida Administrative Code (FAC)

Florida Department of Highway Safety and Motor Vehicles (DHSMV)

Florida Fish and Wildlife Conservation Commission (FWC)

Florida Inland Navigation District (FIND)

Florida Sea Grant (FSG)

Geographic Information System (GIS)

Idle Speed, No Wake (ISNW)

Intracoastal Waterway (IWW)

Lake Okeechobee Datum (LOD)

Land Boundary Information System (LABINS)

Maritime Property (a vessel and/or its contents)

Mean Low Water Level (MLW)

National Geodetic Vertical Datum of 1929 (NGVD29)

National Waterway Network (NWN)

Numeric Speed Limit (NSL)

Okeechobee Waterway (OWW)

Ports and Waterways Safety Assessment (PAWSA)

Post, Buckley, Schuh & Jernigan (PBS&J)

Slow Speed, Minimum Wake (SSMW)

United States Army Corps of Engineers (USACE)

United States Coast Guard (USCG)

Vector files (points, lines, curves, and polygons used to represent images in computer graphics).

DRAFT