FIGURE 3.1: KEY MAP
Nags Head , North Carolina
Nags Head Wastewater Management Program

Location Map

Source: Orthophoto, State Lands, Town Boundary, Town of Nags Head Planning Department, March, 2004; Study Area, SEI, 2004; Hydrography, National Hydrography Dataset, 1999.

O:\Proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig3.1_KeyMap.mxd 10-15-04 caw

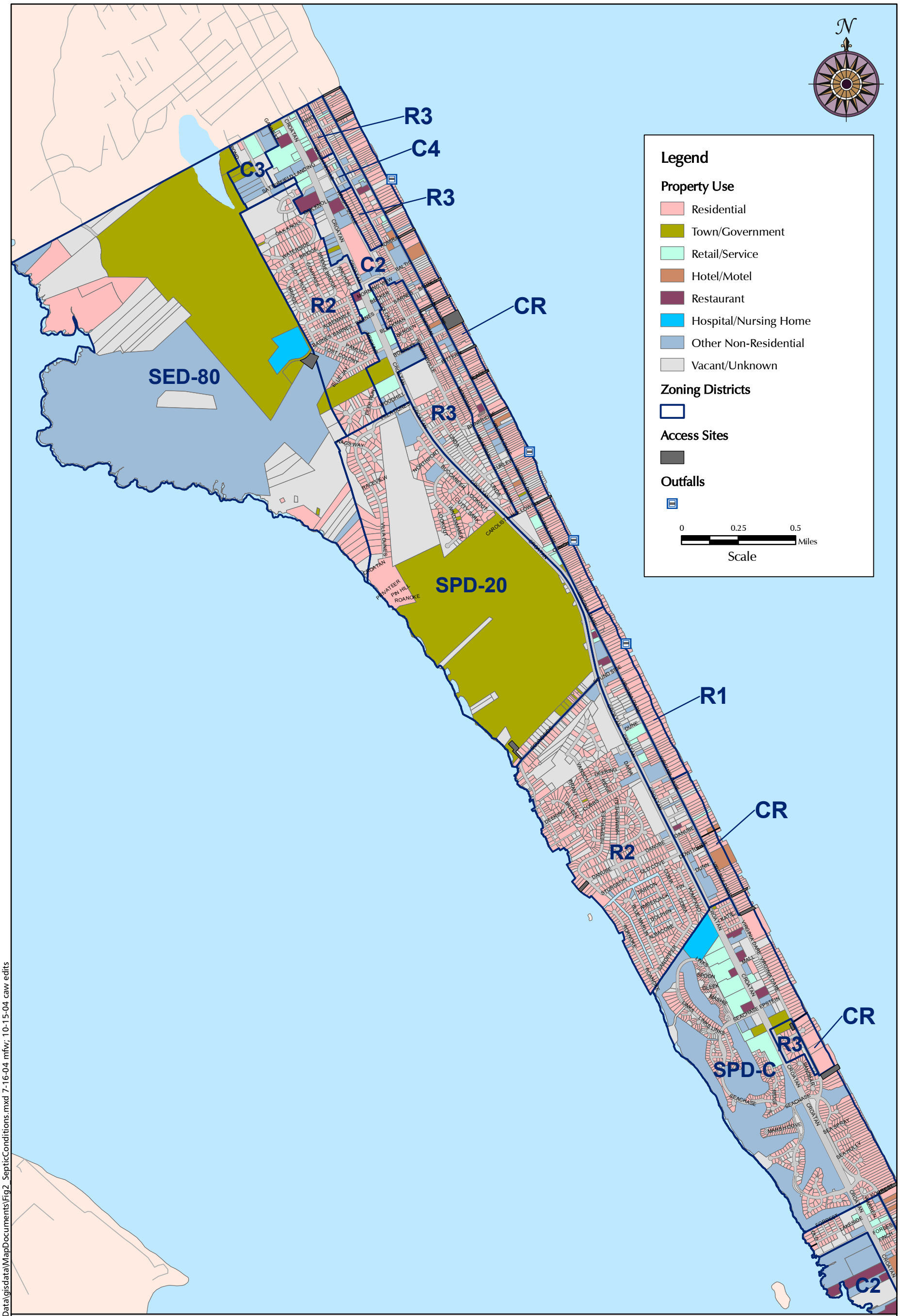


FIGURE 3.2a: PROPERTY USE AND ZONING

North Nags Head

Nags Head Wastewater Management Program

Location Map

Source: Parcels and Zoning from Town of Nags Head Planning Department, March, 2004;
Parcel Use from Tax Assessment Database, Dare County, May 2004.

O:\Proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig2_SepticConditions.mxd 7-16-04 mfw; 10-15-04 caw edits

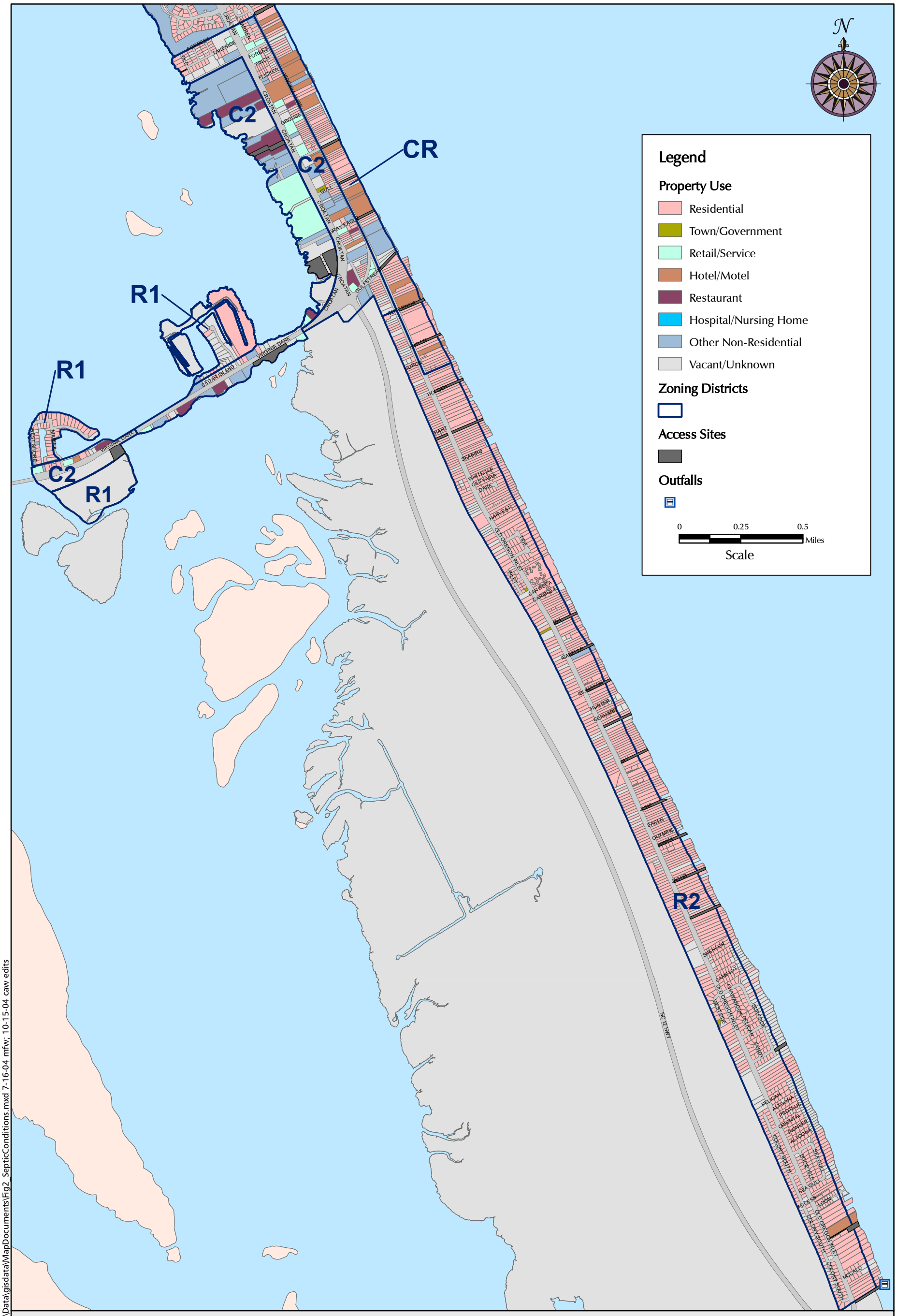


FIGURE 3.2b: PROPERTY USE AND ZONING

South Nags Head

Nags Head Wastewater Management Program

Location Map

Source: Parcels and Zoning from Town of Nags Head Planning Department, March, 2004;
Parcel Use from Tax Assessment Database, Dare County, May 2004.

O:\Proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig2_SepticConditions.mxd 7-16-04 mfw; 10-15-04 caw edits

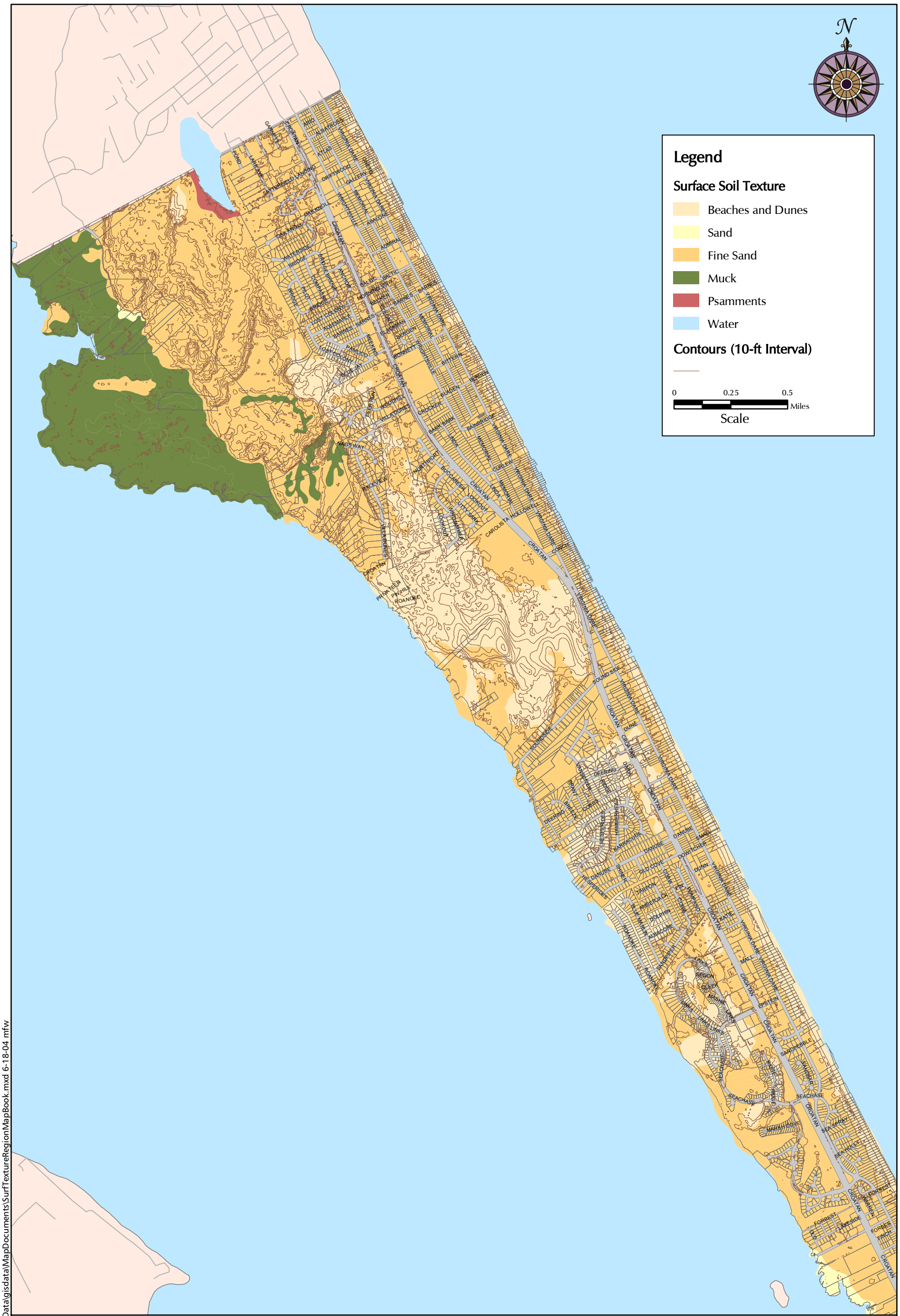


FIGURE 3.3a PREDOMINANT SURFACE SOIL TEXTURE
North Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Town of Nags Head Planning Department, March, 2004. Permeability from SSURGO database, 1999.

O:\Proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\SurfTextureRegionMapBook.mxd 6-18-04 mfw

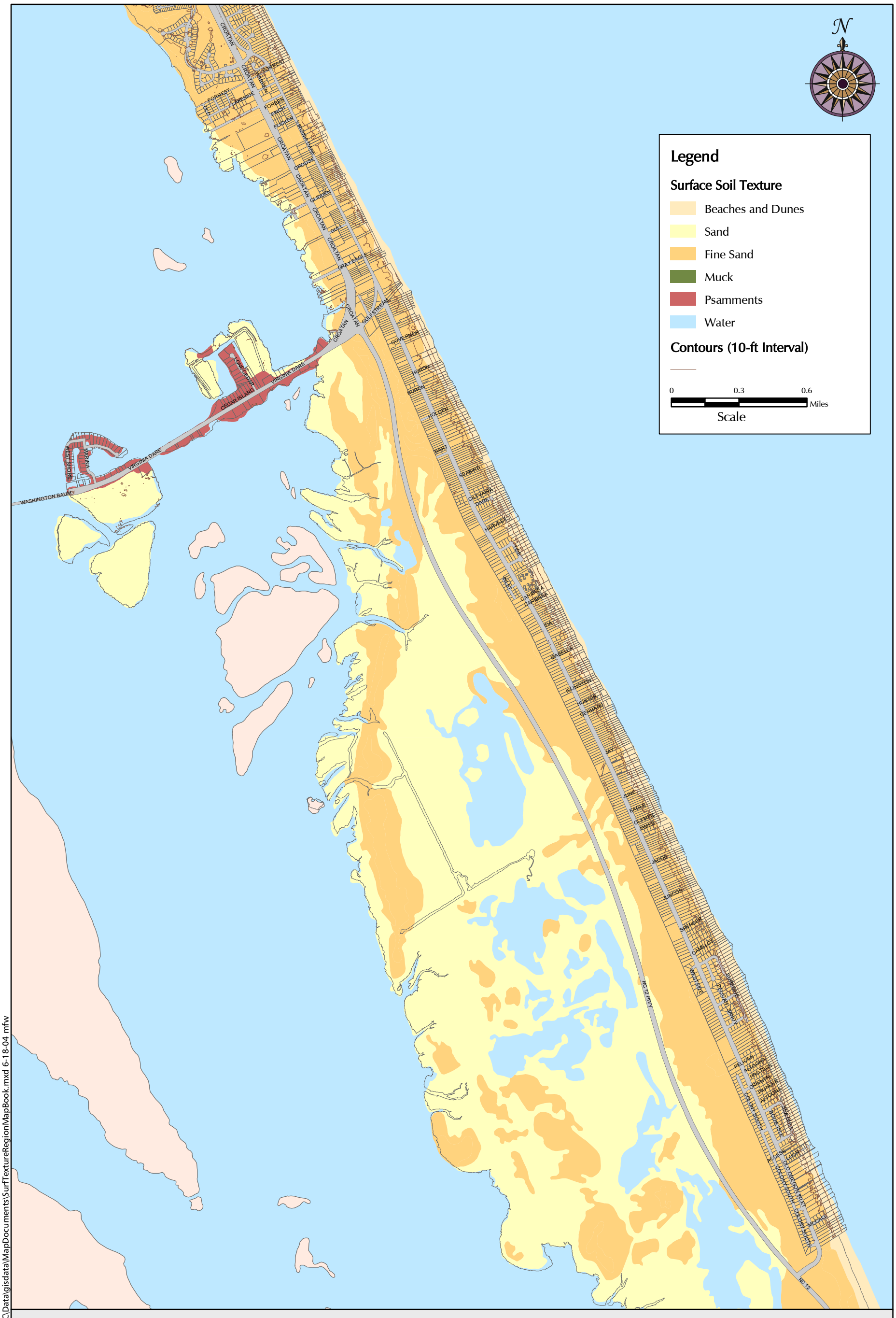


FIGURE 3.3b: PREDOMINANT SURFACE SOIL TEXTURE
South Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Town of Nags Head Planning Department, March, 2004. Permeability from SSURGO database, 1999.

O:\Proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\SurfTextureRegionMapBook.mxd 6-18-04 mfw

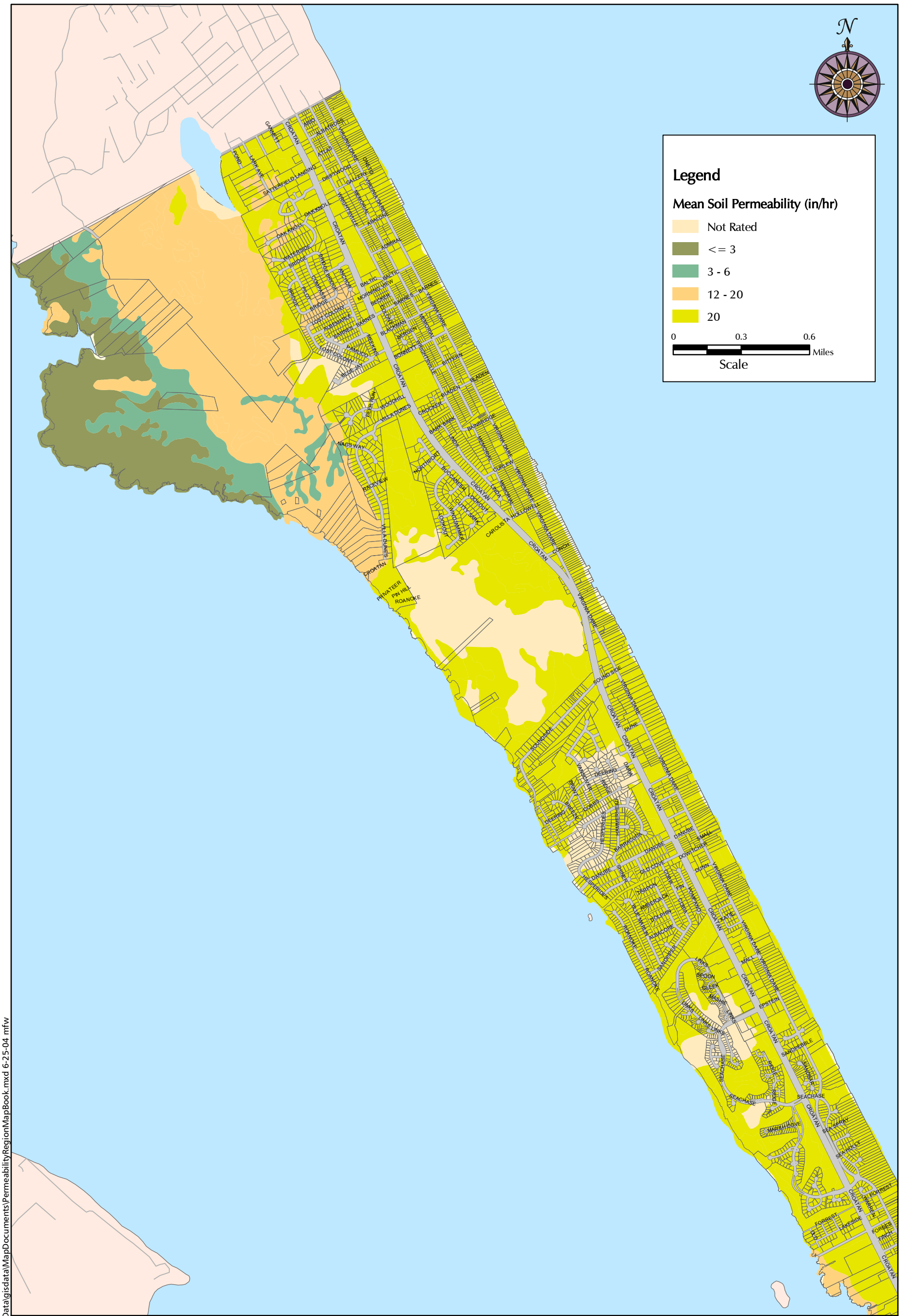


FIGURE 3.4a: MEAN SOIL PERMEABILITY
North Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Town of Nags Head Planning Department, March, 2004; Permeability from SSURGO database, 1999.

O:\Proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\PermeabilityRegionMapBook.mxd 6-25-04 mfw

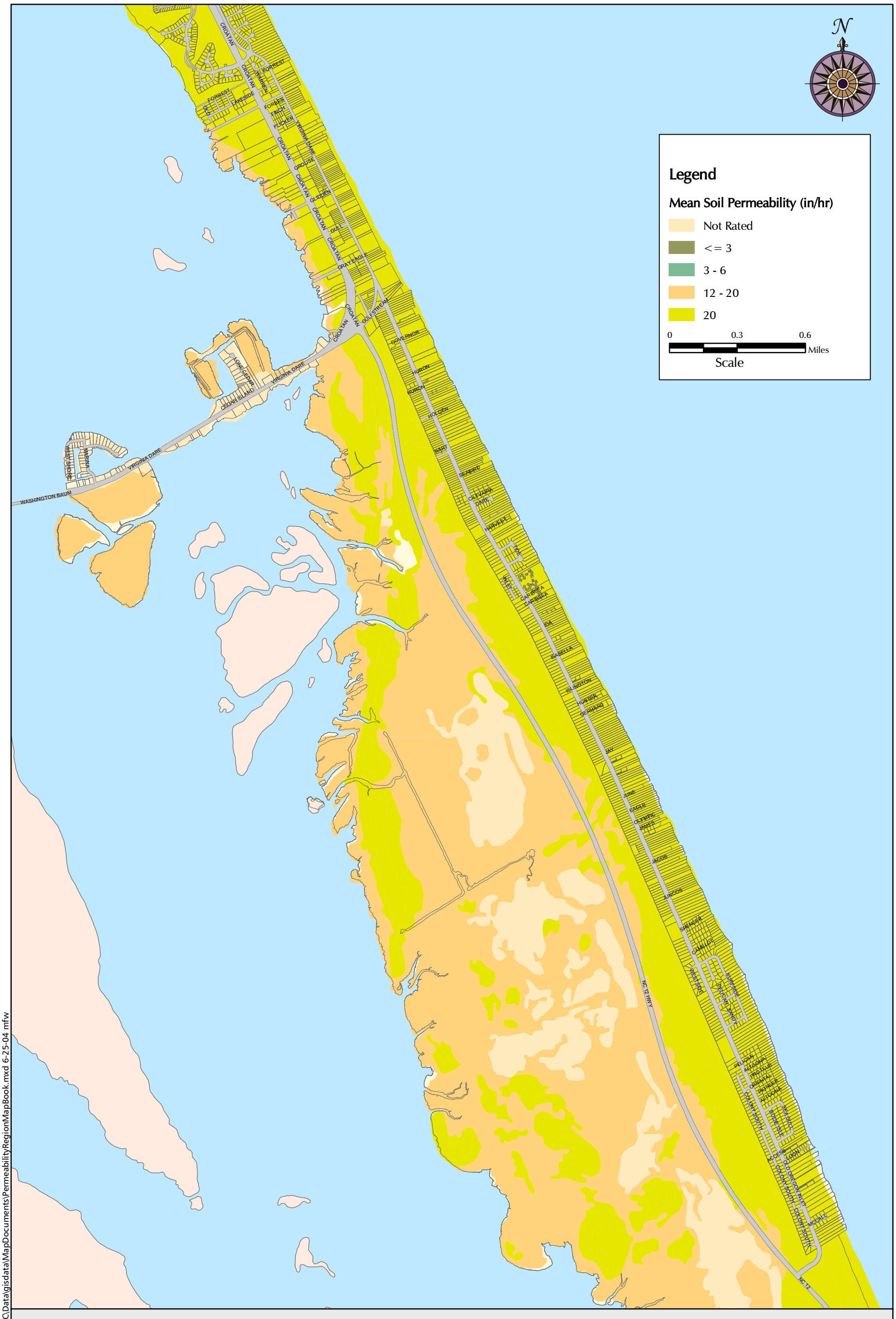
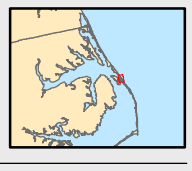


FIGURE 3.4b: MEAN SOIL PERMEABILITY
South Nags Head
Nags Head Wastewater Management Program

Location Map



Source: Town of Nags Head Planning Department, March, 2004; Permeability from SSURGO database, 1999.

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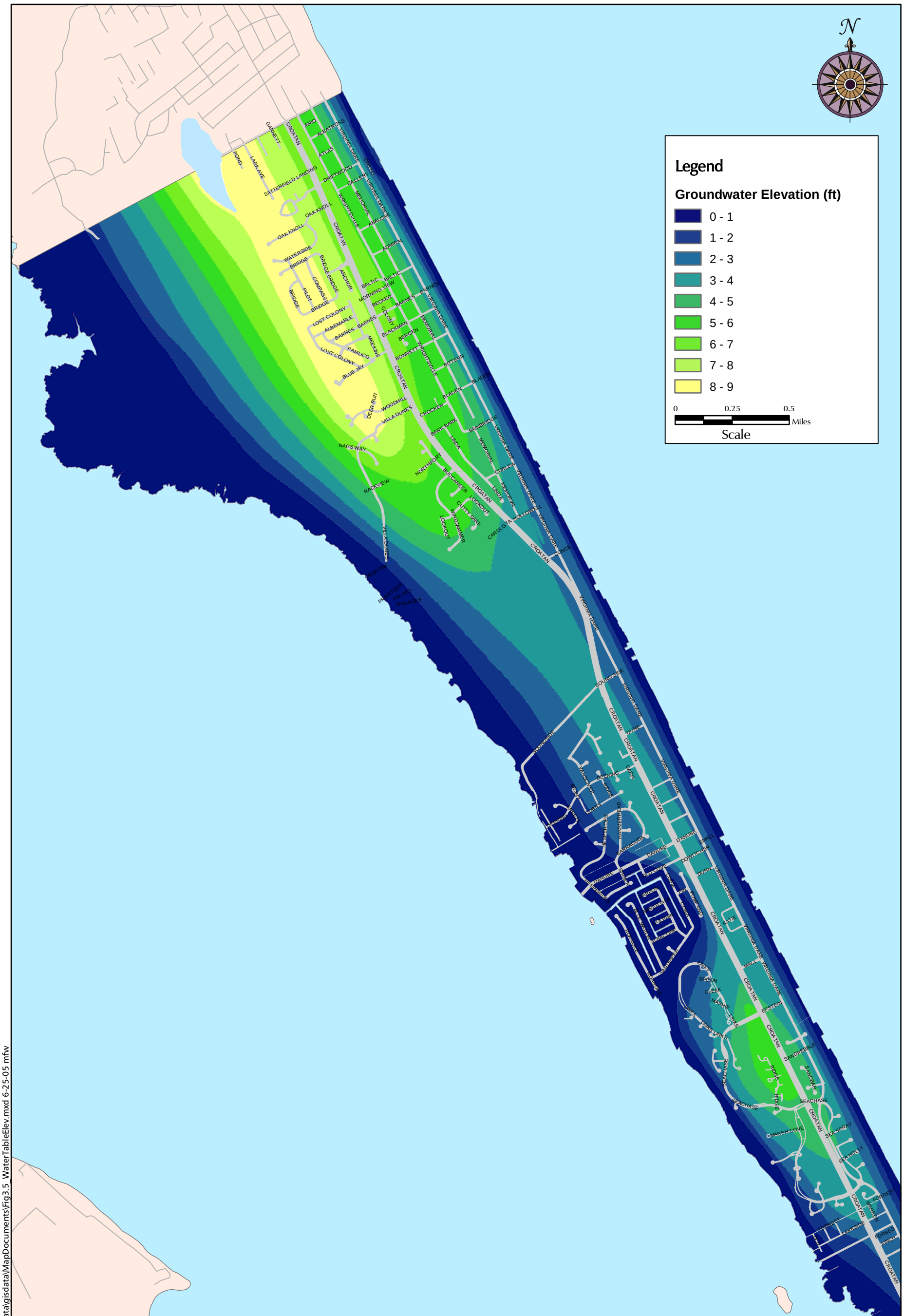


FIGURE 3.5a: GROUNDWATER TABLE ELEVATION
North Nags Head
Nags Head Wastewater Management Program

Location Map

Source: June 2004 - April 2005 water levels from Town of Nags Head Planning Department, May, 2005; Water table profiles from "Hydrogeology of the Nags Head Woods Area, Kill Devil Hills and Nags Head, North Carolina", Whittecar and Salyer, 1986.

O:\Proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig3.5_WaterTableElev.mxd 6-25-05 mfw

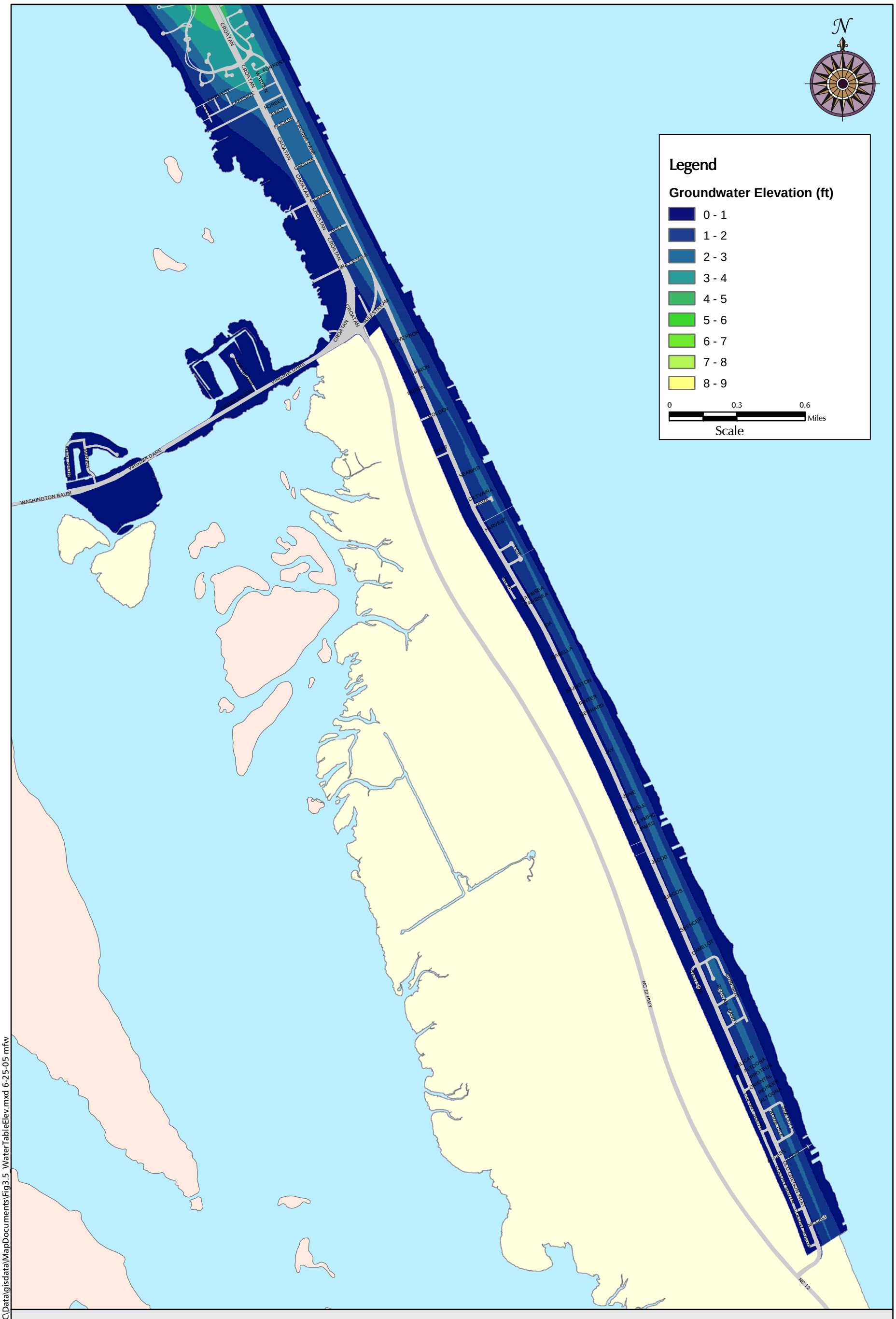


FIGURE 3.5b: GROUNDWATER TABLE ELEVATION
South Nags Head
Nags Head Wastewater Management Program

Location Map

Source: June 2004 - April 2005 water levels from Town of Nags Head Planning Department, May, 2005; Water table profiles from "Hydrogeology of the Nags Head Woods Area, Kill Devil Hills and Nags Head, North Carolina", Whittecar and Salyer, 1986.

O:\Proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig3.5_WaterTableElev.mxd 6-25-05 mfw

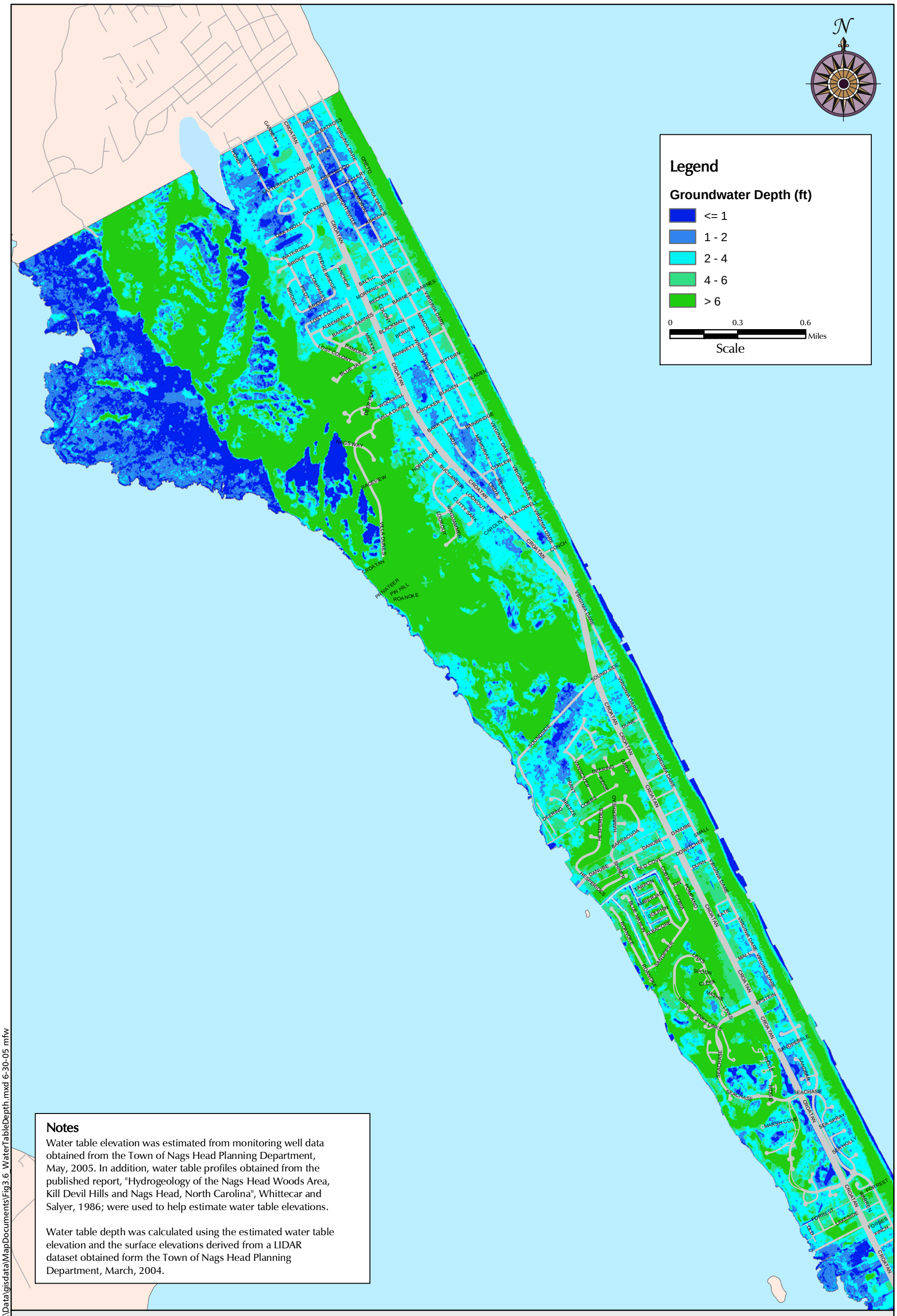
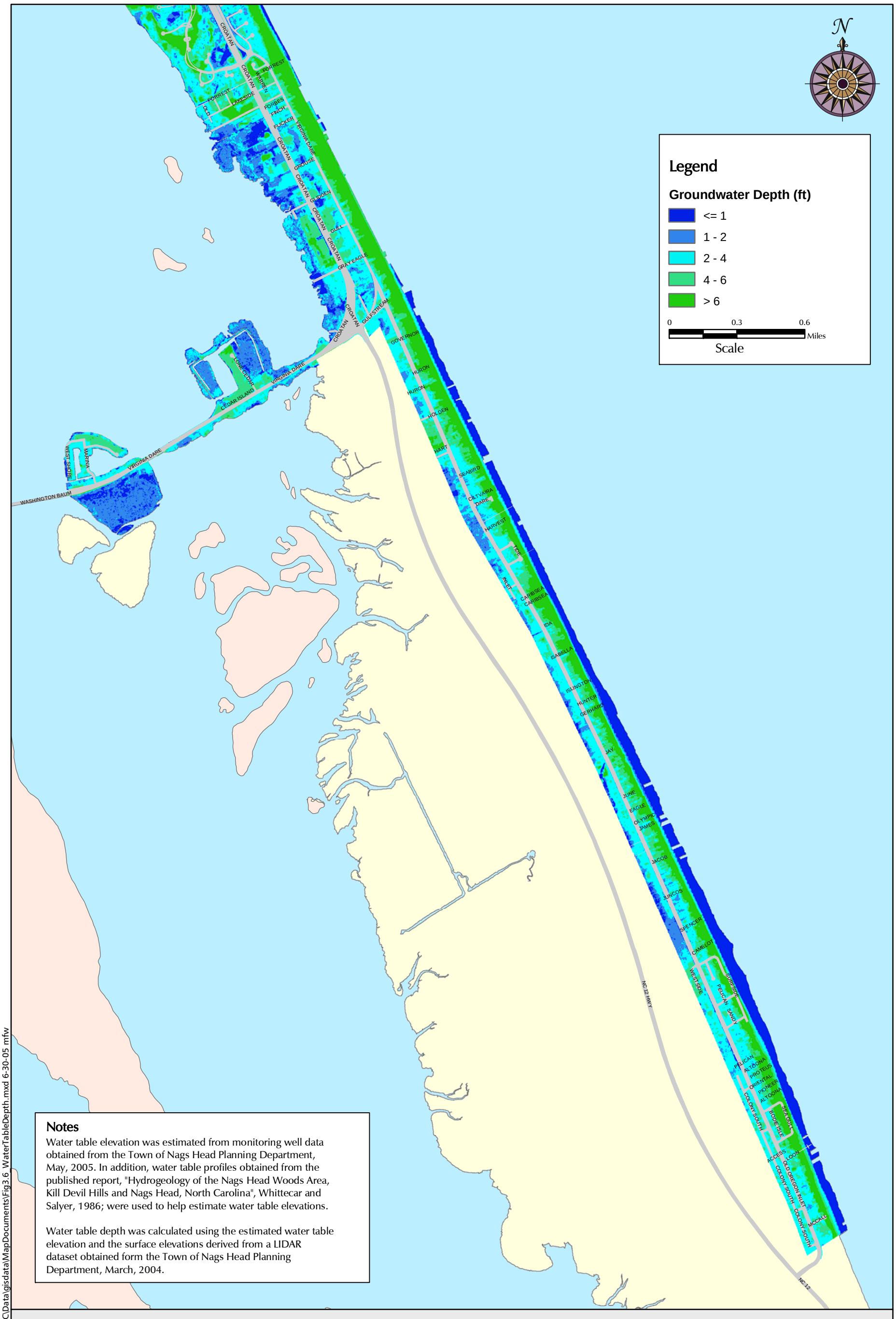


FIGURE 3.6a: GROUNDWATER TABLE DEPTH
North Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Water levels from Town of Nags Head Planning Department, May, 2005; Water table profiles from "Hydrogeology of the Nags Head Woods Area, Kill Devil Hills and Nags Head, North Carolina", Whittecar and Salyer, 1986; Surface elevations from LIDAR dataset of Nags Head, Town of Nags Head Planning Department, March, 2004.

O:\proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig3.6_WaterTableDepth.mxd 6-30-05 mfw



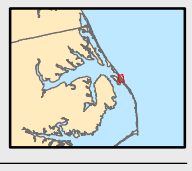
Notes

Water table elevation was estimated from monitoring well data obtained from the Town of Nags Head Planning Department, May, 2005. In addition, water table profiles obtained from the published report, "Hydrogeology of the Nags Head Woods Area, Kill Devil Hills and Nags Head, North Carolina", Whittecar and Salyer, 1986; were used to help estimate water table elevations.

Water table depth was calculated using the estimated water table elevation and the surface elevations derived from a LIDAR dataset obtained form the Town of Nags Head Planning Department, March, 2004.

FIGURE 3.6b: GROUNDWATER TABLE DEPTH
South Nags Head
Nags Head Wastewater Management Program

Location Map



Source: Water levels from Town of Nags Head Planning Department, May, 2005; Water table profiles from "Hydrogeology of the Nags Head Woods Area, Kill Devil Hills and Nags Head, North Carolina", Whittecar and Salyer, 1986; Surface elevations from LIDAR dataset of Nags Head, Town of Nags Head Planning Department, March, 2004.

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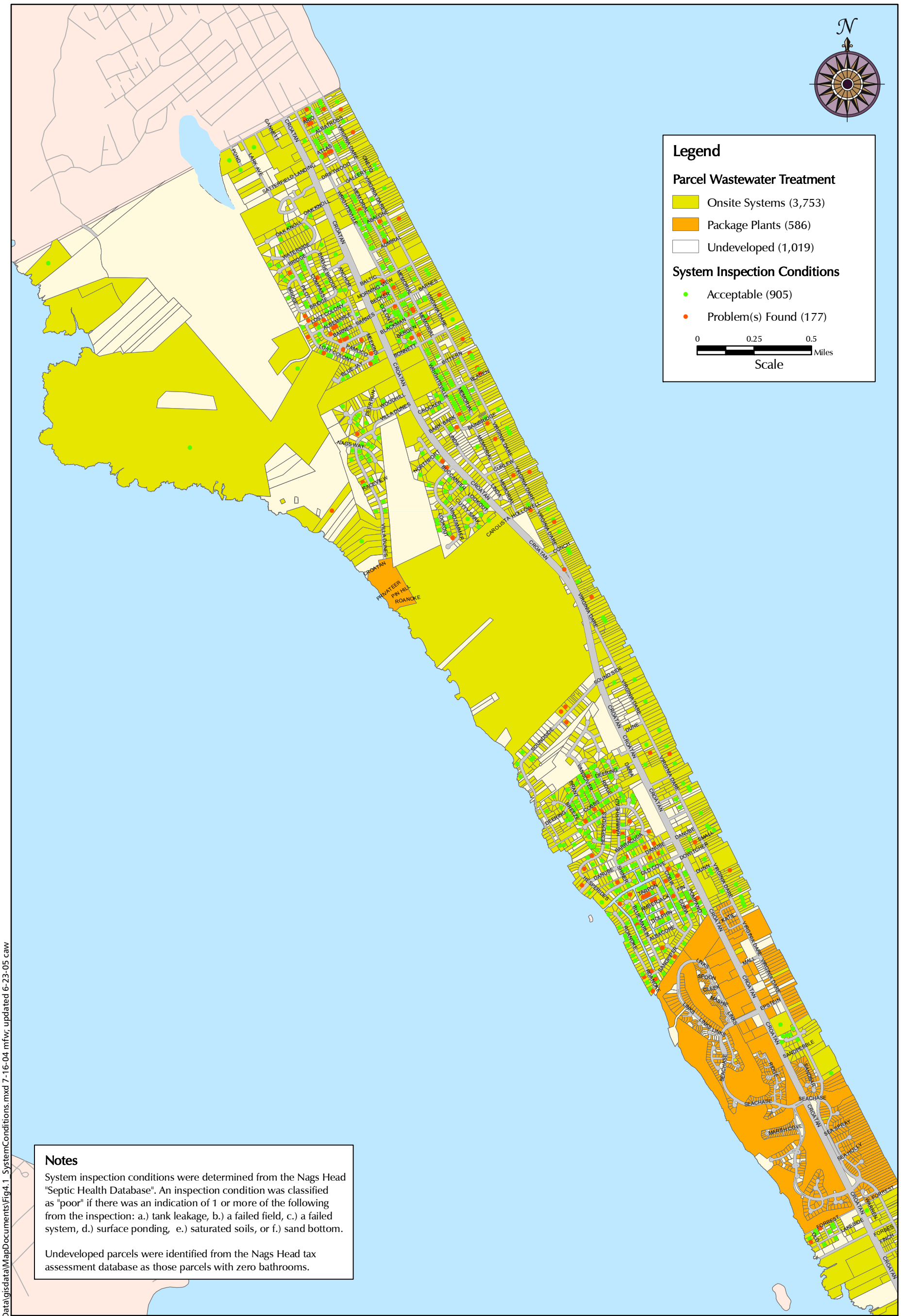

FIGURE 4.1a: PARCEL WASTEWATER TREATMENT CONDITIONS

North Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004; Onsite System Inspection Conditions from Nags Head Septic Health Database, July, 2004; Wastewater Treatment, Nags Head Planning Department & Tax Assessment Database, July 2004; Tax Assessment Database, Dare County, May 2004.

O:\Proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig4.1_SystemConditions.mxd 7-16-04 mfw; updated 6-23-05 caw

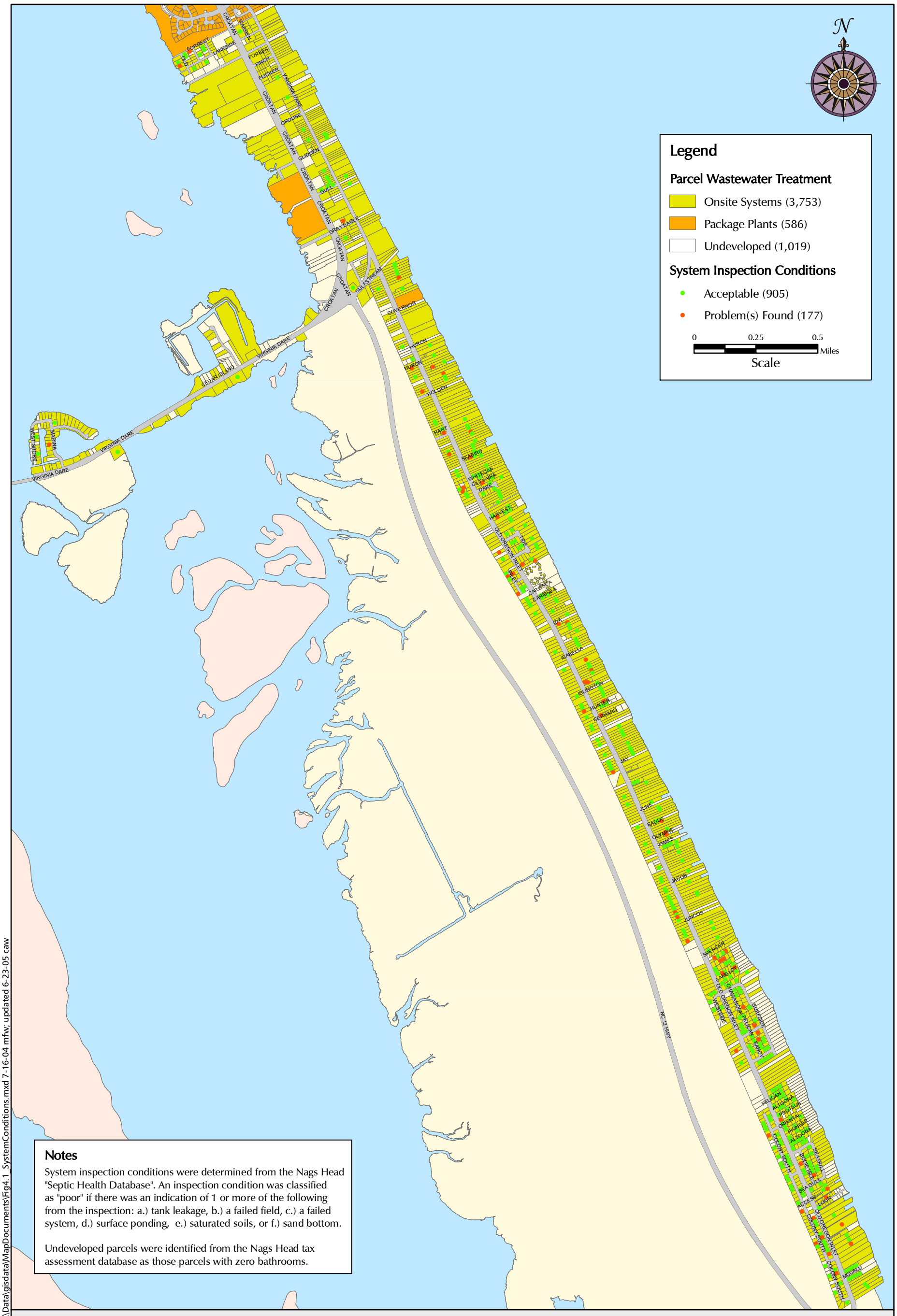

FIGURE 4.1b: PARCEL WASTEWATER TREATMENT CONDITIONS

South Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004; Onsite System Inspection Conditions from Nags Head Septic Health Database, July, 2004; Wastewater Treatment, Nags Head Planning Department & Tax Assessment Database, July 2004; Tax Assessment Database, Dare County, May 2004.

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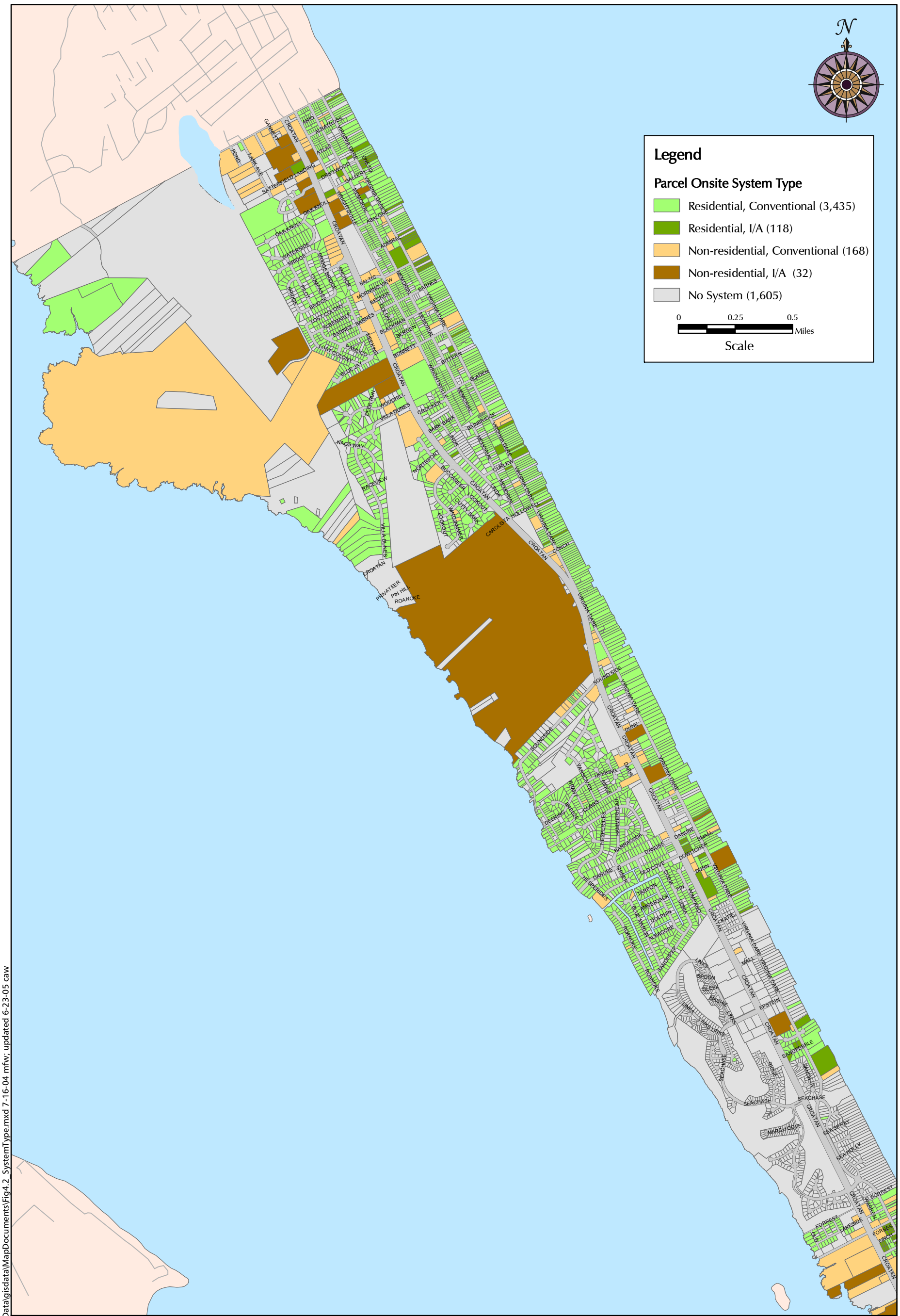


FIGURE 4.2a: PARCEL ONSITE SYSTEM TYPE

North Nags Head

Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Onsite System Type from Town of Nags Head Planning Department, July, 2004;
Tax Assessment Database, Dare County, May 2004.

O:\Proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig4.2_SystemType.mxd 7-16-04 mfw; updated 6-23-05 caw

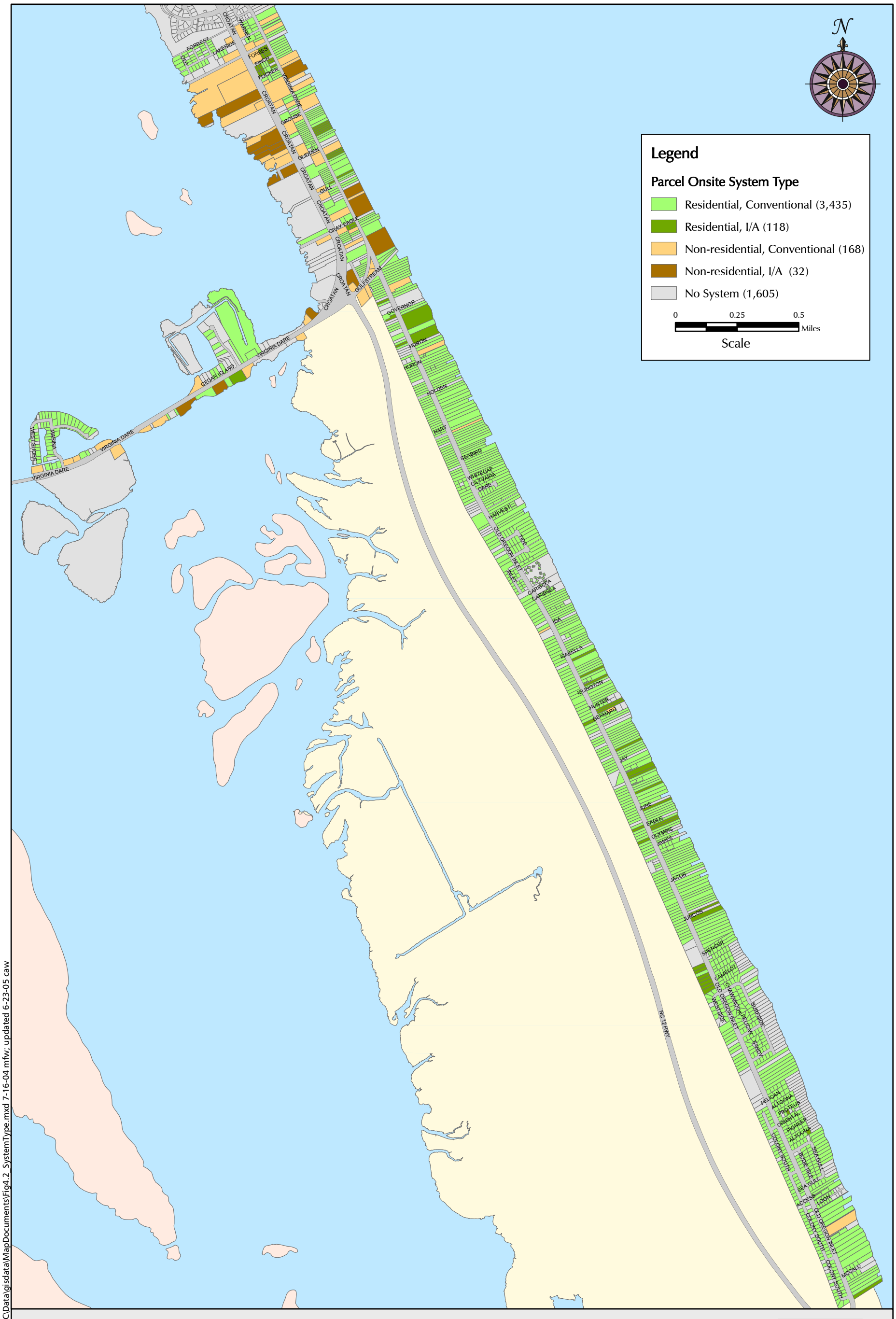
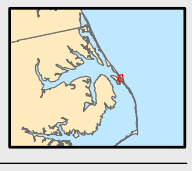


FIGURE 4.2b: PARCEL ONSITE SYSTEM TYPE

South Nags Head

Nags Head Wastewater Management Program

Location Map



Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Onsite System Type from Town of Nags Head Planning Department, July, 2004;
Tax Assessment Database, Dare County, May 2004.

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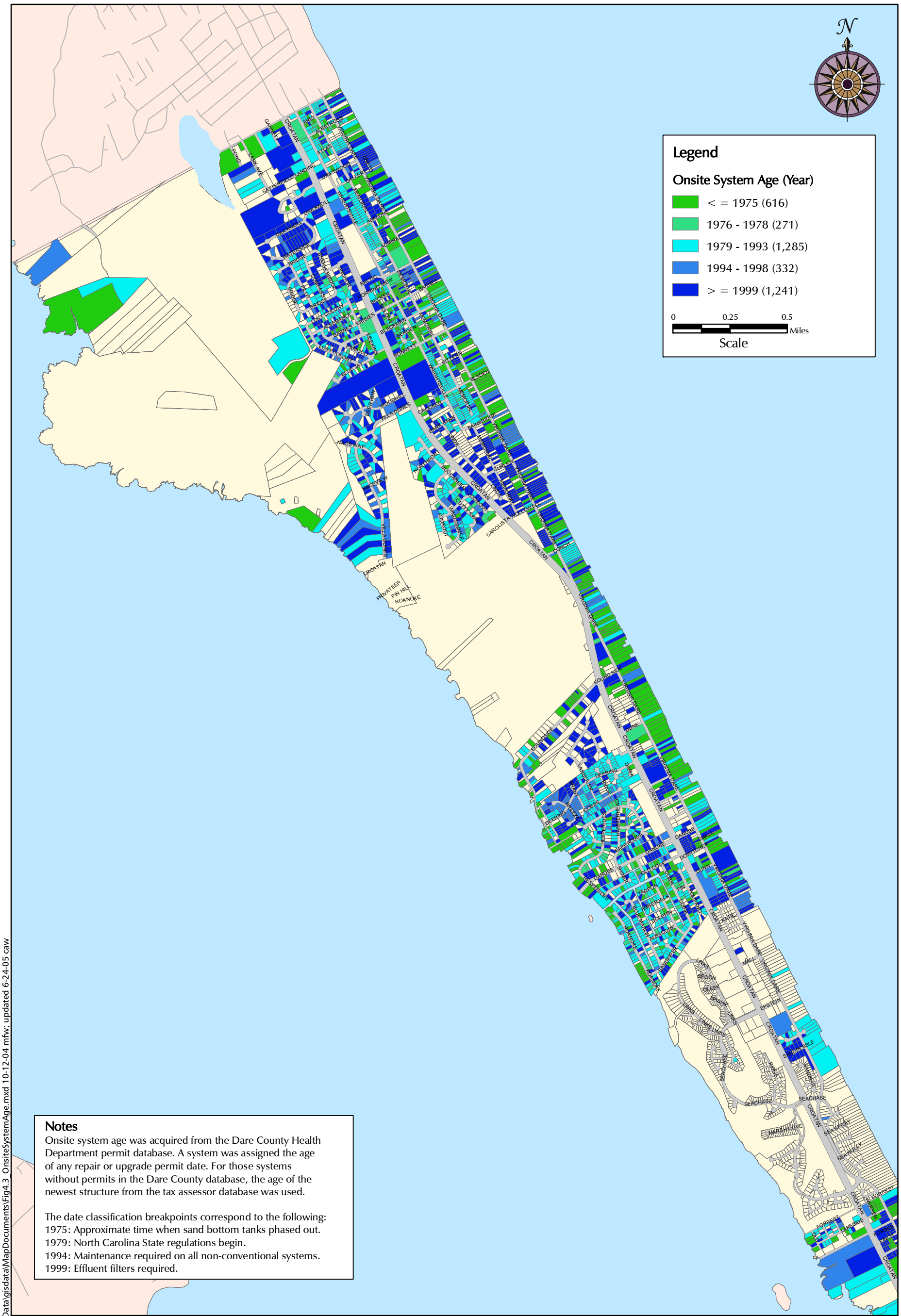

Notes

Onsite system age was acquired from the Dare County Health Department permit database. A system was assigned the age of any repair or upgrade permit date. For those systems without permits in the Dare County database, the age of the newest structure from the tax assessor database was used.

The date classification breakpoints correspond to the following:
1975: Approximate time when sand bottom tanks phased out.
1979: North Carolina State regulations begin.
1994: Maintenance required on all non-conventional systems.
1999: Effluent filters required.

FIGURE 4.3a: ONSITE SYSTEM AGE

North Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Onsite System Age Tax assessment database, May 2004 and Permit database, August, 2004.

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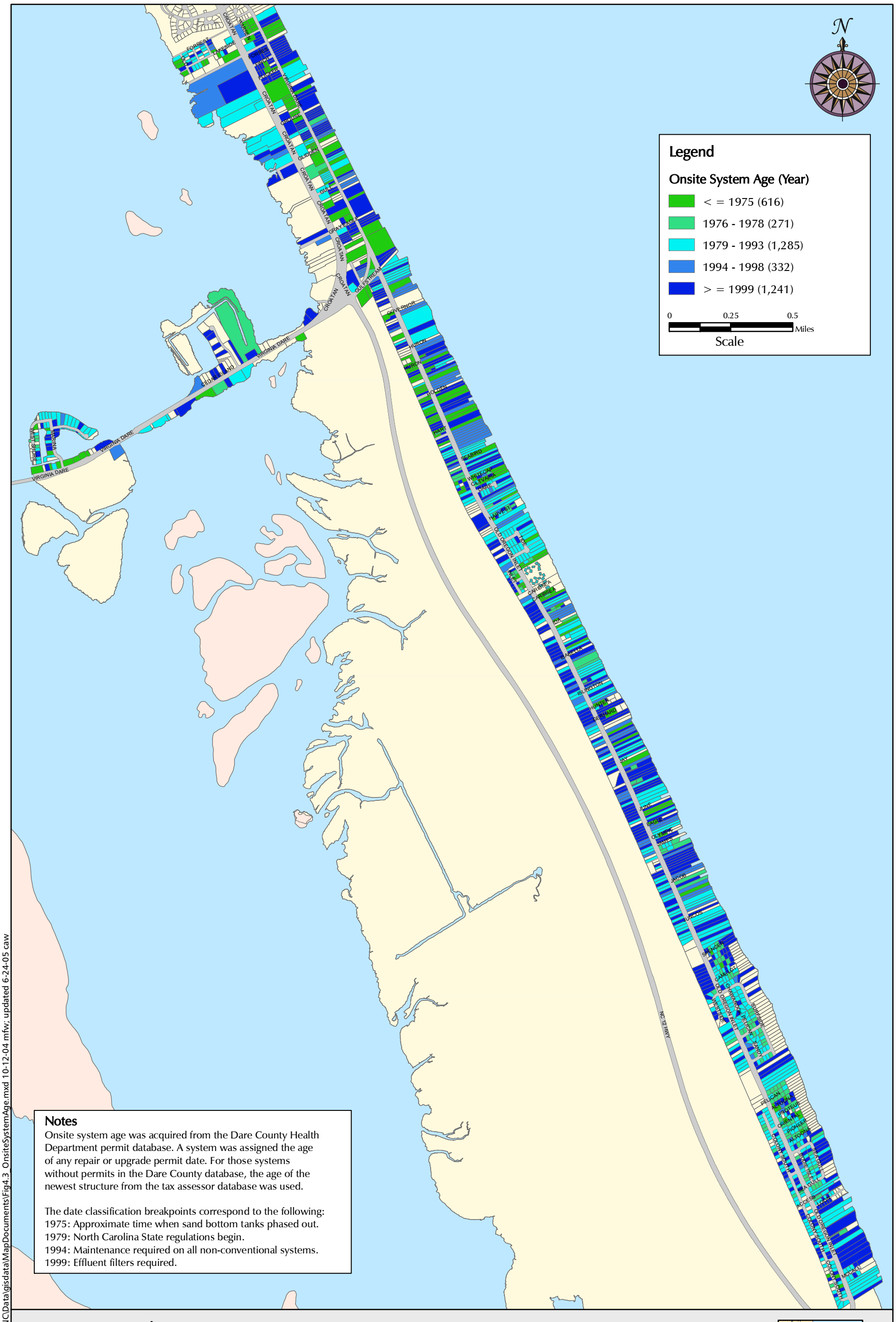

FIGURE 4.3b: ONSITE SYSTEM AGE

South Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Onsite System Age Tax assessment database, May 2004 and Permit database, August, 2004.

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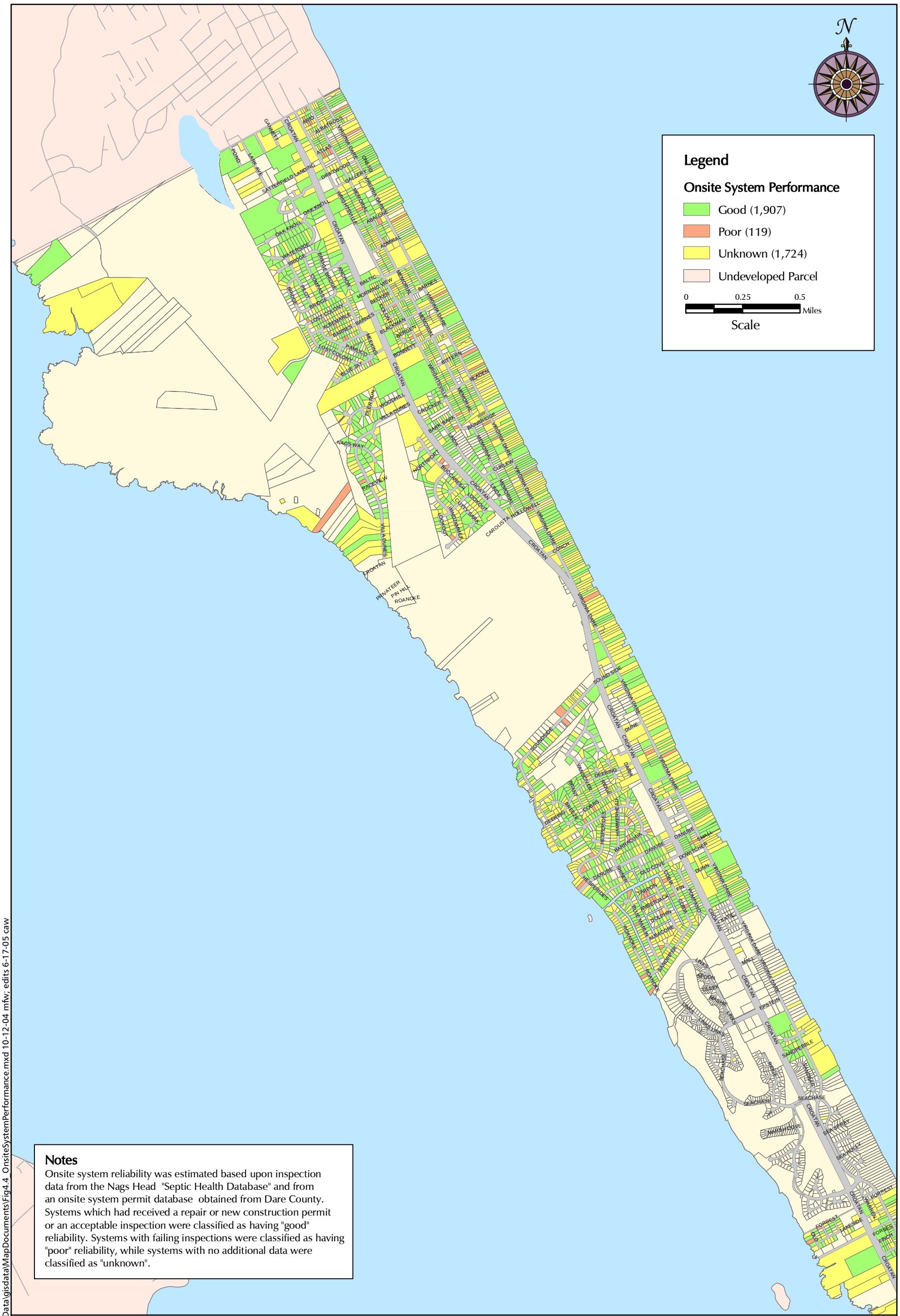

FIGURE 4.4a: ONSITE SYSTEM PERFORMANCE
North Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Onsite System Performance from Nags Head Septic Health Database, September, 2004
and Onsite system permit database, Dare County, August, 2004.

O:\proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig4.4_OnsiteSystemPerformance.mxd 10-12-04 mfw; edits 6-17-05 caw

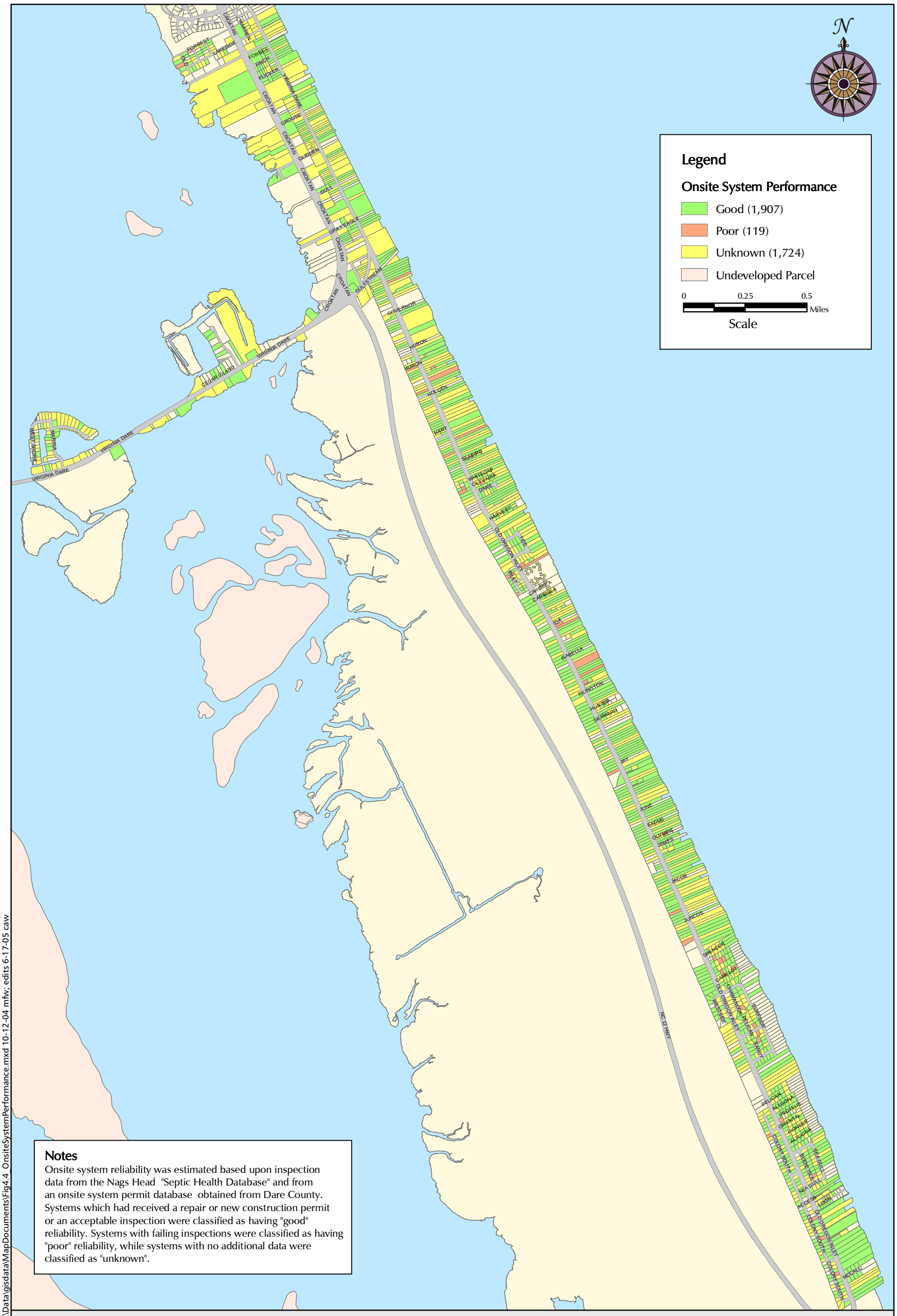

FIGURE 4.4b: ONSITE SYSTEM PERFORMANCE
South Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Onsite System Performance from Nags Head Septic Health Database, September, 2004
and Onsite system permit database, Dare County, August, 2004.

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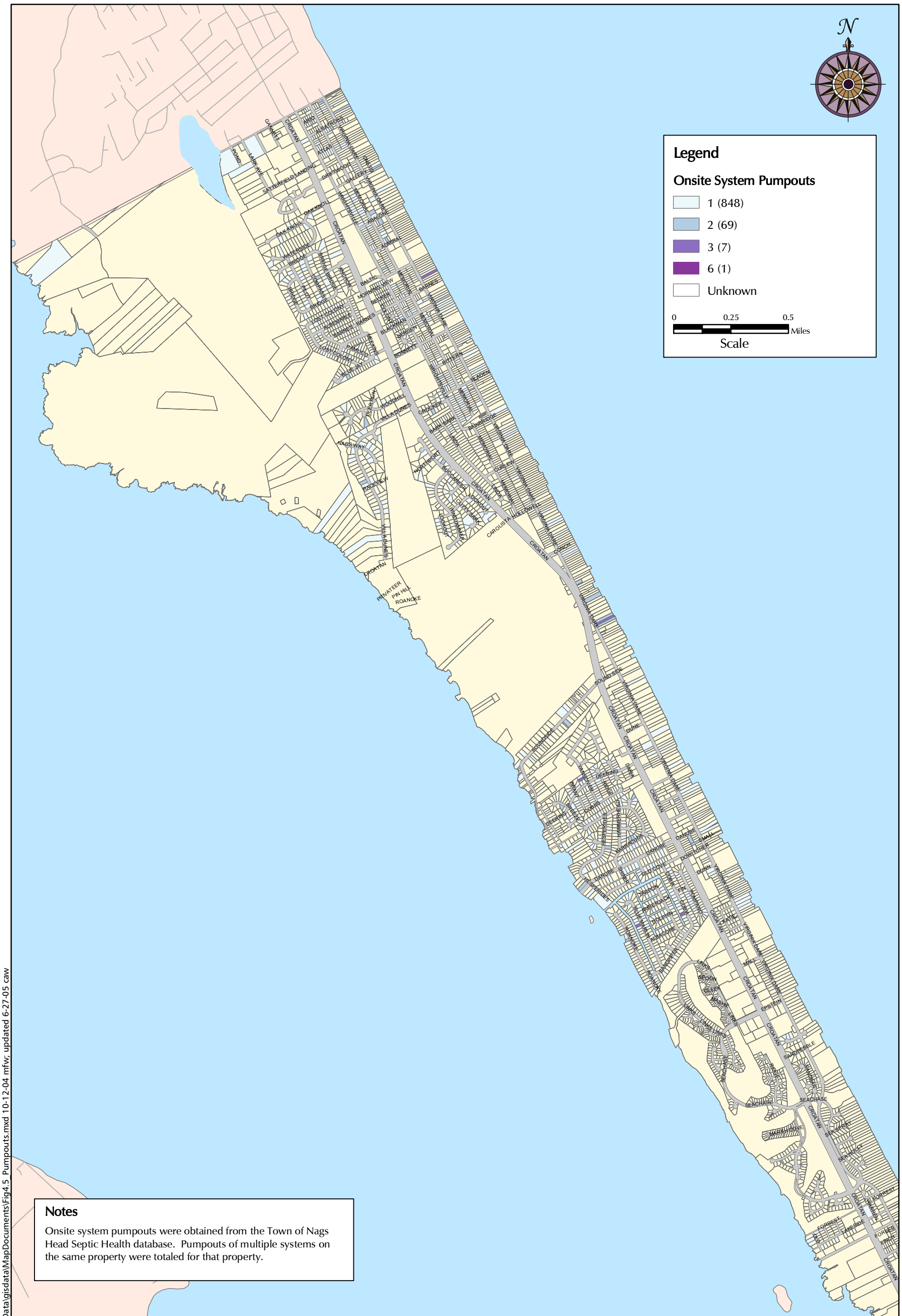

FIGURE 4.5a: ONSITE SYSTEM PUMPOUTS

North Nags Head

Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Onsite System Pumpouts, Septic Health database, October 2004.

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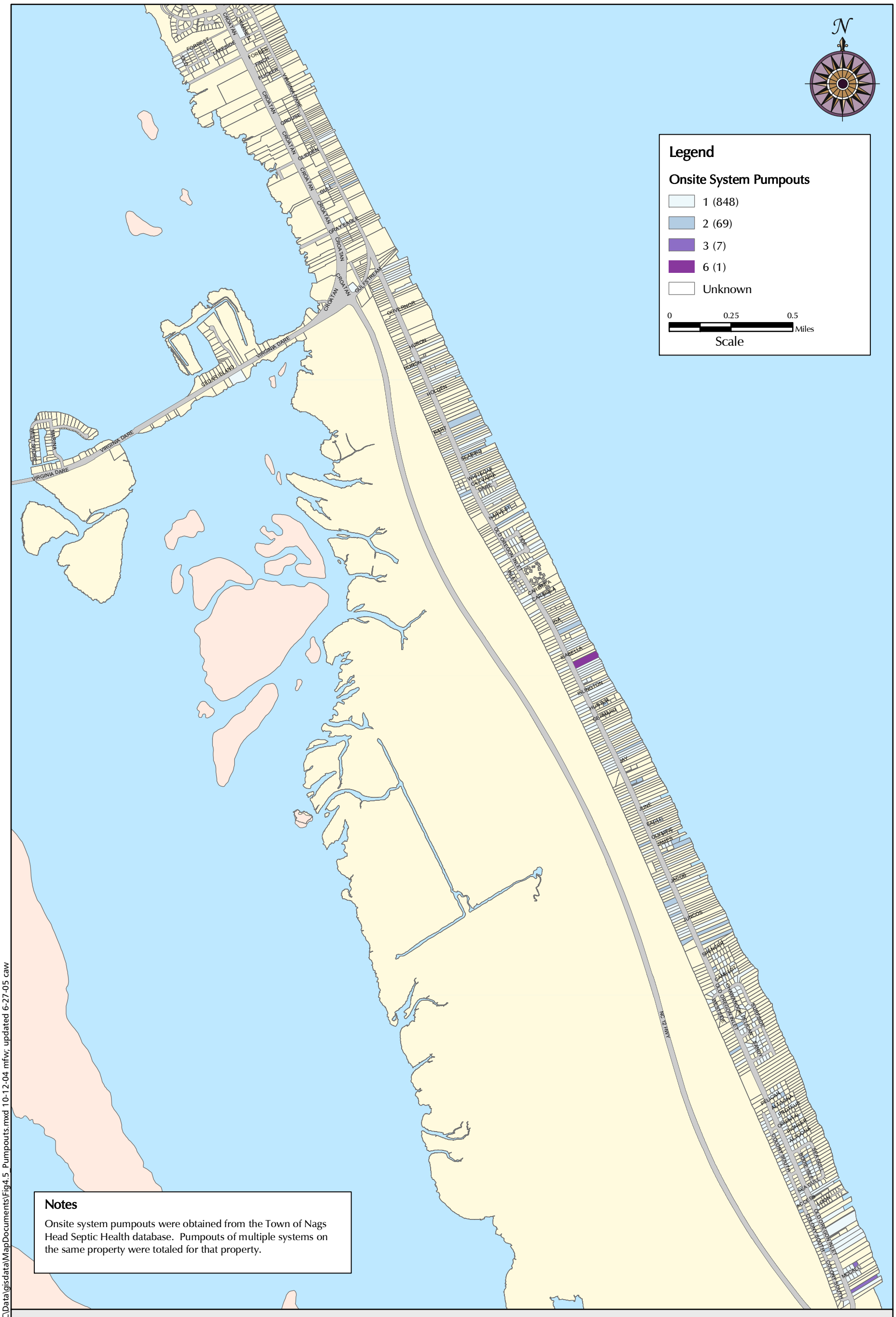
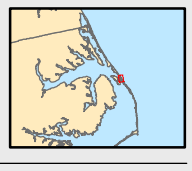


FIGURE 4.5b: ONSITE SYSTEM PUMPOUTS

South Nags Head

Nags Head Wastewater Management Program

Location Map



Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Onsite System Pumpouts, Septic Health database, October 2004.

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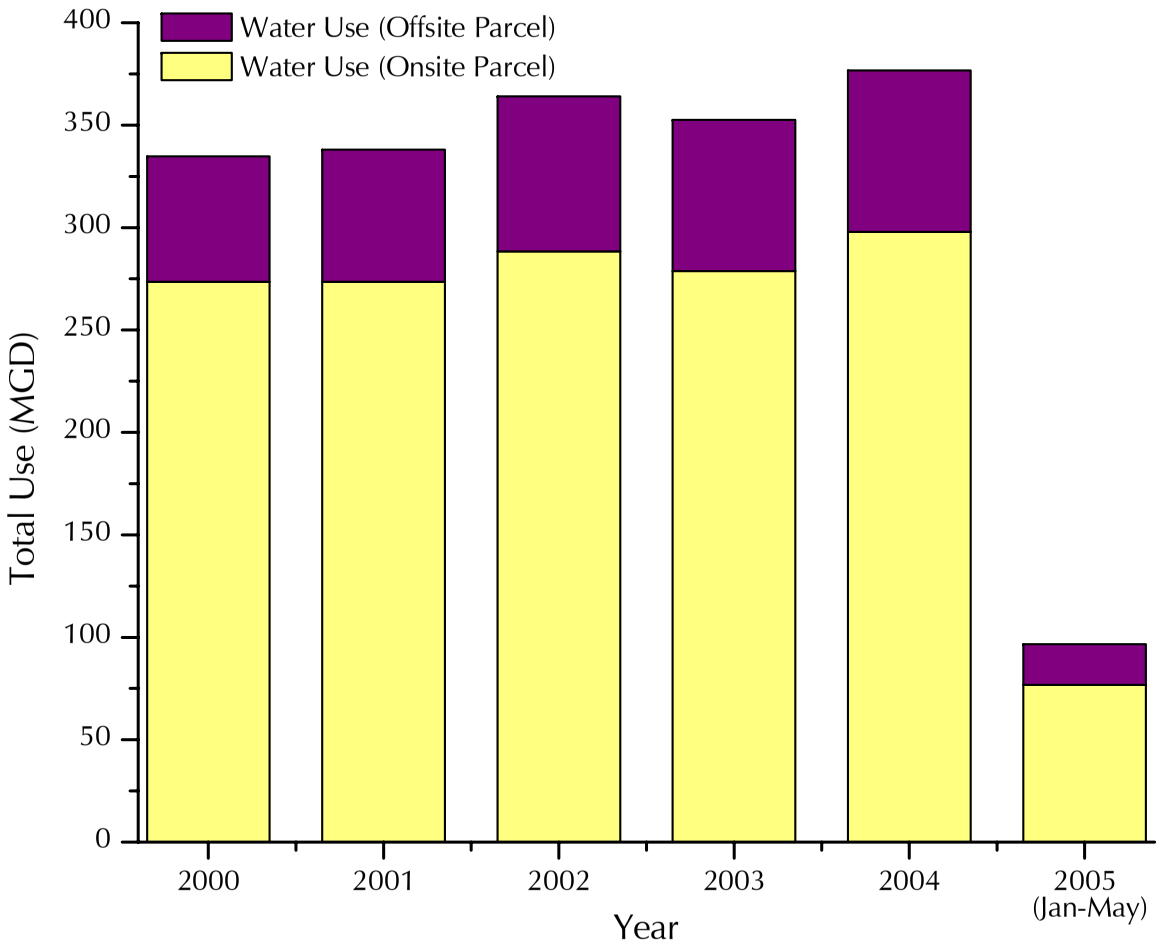

FIGURE 4.6: TOTAL WATER USE BY YEAR
Nags Head Wastewater Management Plan

Source: Town of Nags Head Planning Department, June 2005.
Path: O:\proj-04\1477-W-NagsHeadNC\Reports\FinalTechnicalReport\Figures\Figure4-6.opj 1/6/2005 djl; rev 6/23/05 anm

STONE ENVIRONMENTAL INC

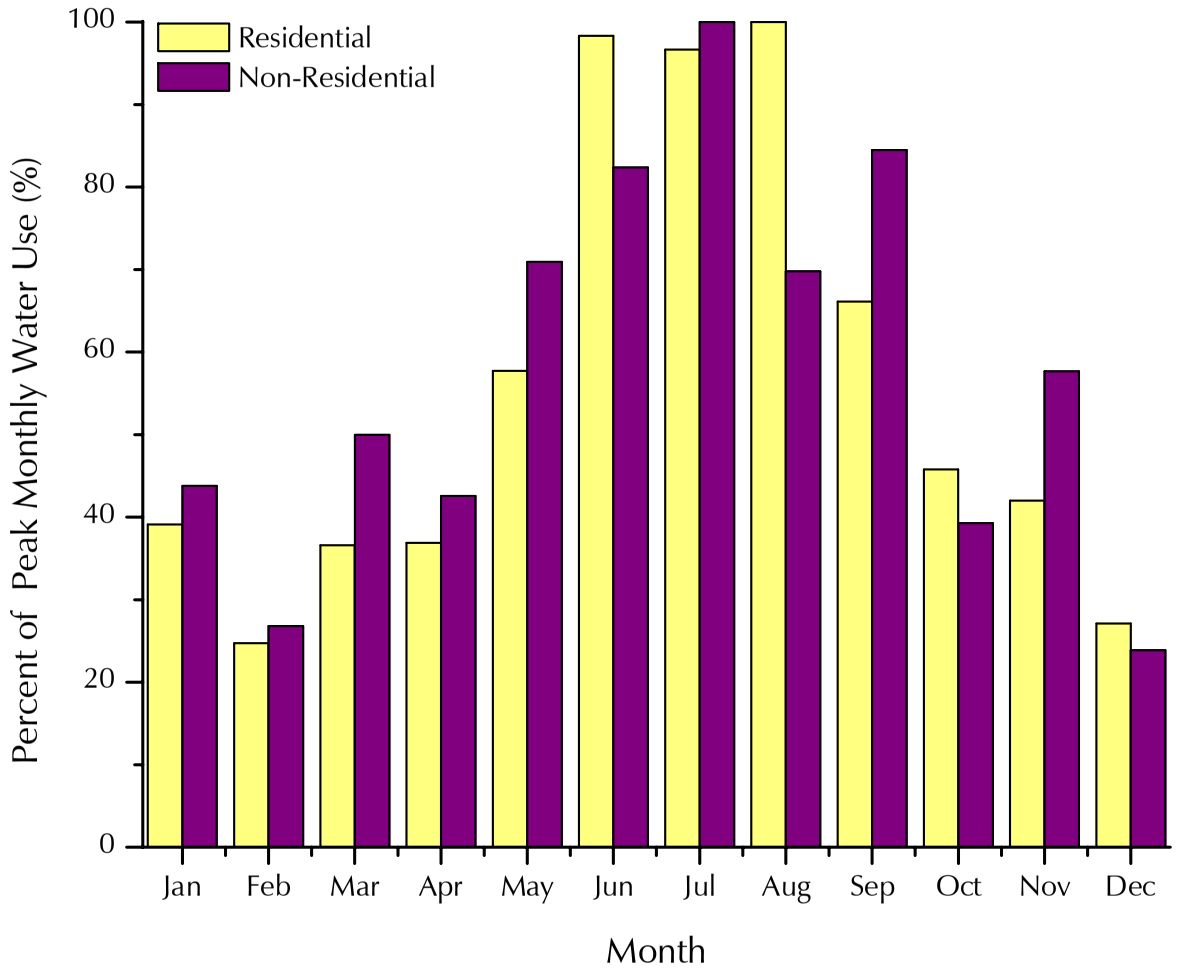

FIGURE 4.7: MONTHLY WATER USE TRENDS
Nags Head Wastewater Management Plan

Source: Town of Nags Head Planning Department, June 2005.
Path: O:\proj-04\1477-W-NagsHeadNC\Reports\FinalTechnicalReport\Figures\Figure4-7.opj 1/6/2005 djl; rev 6/23/05 anm

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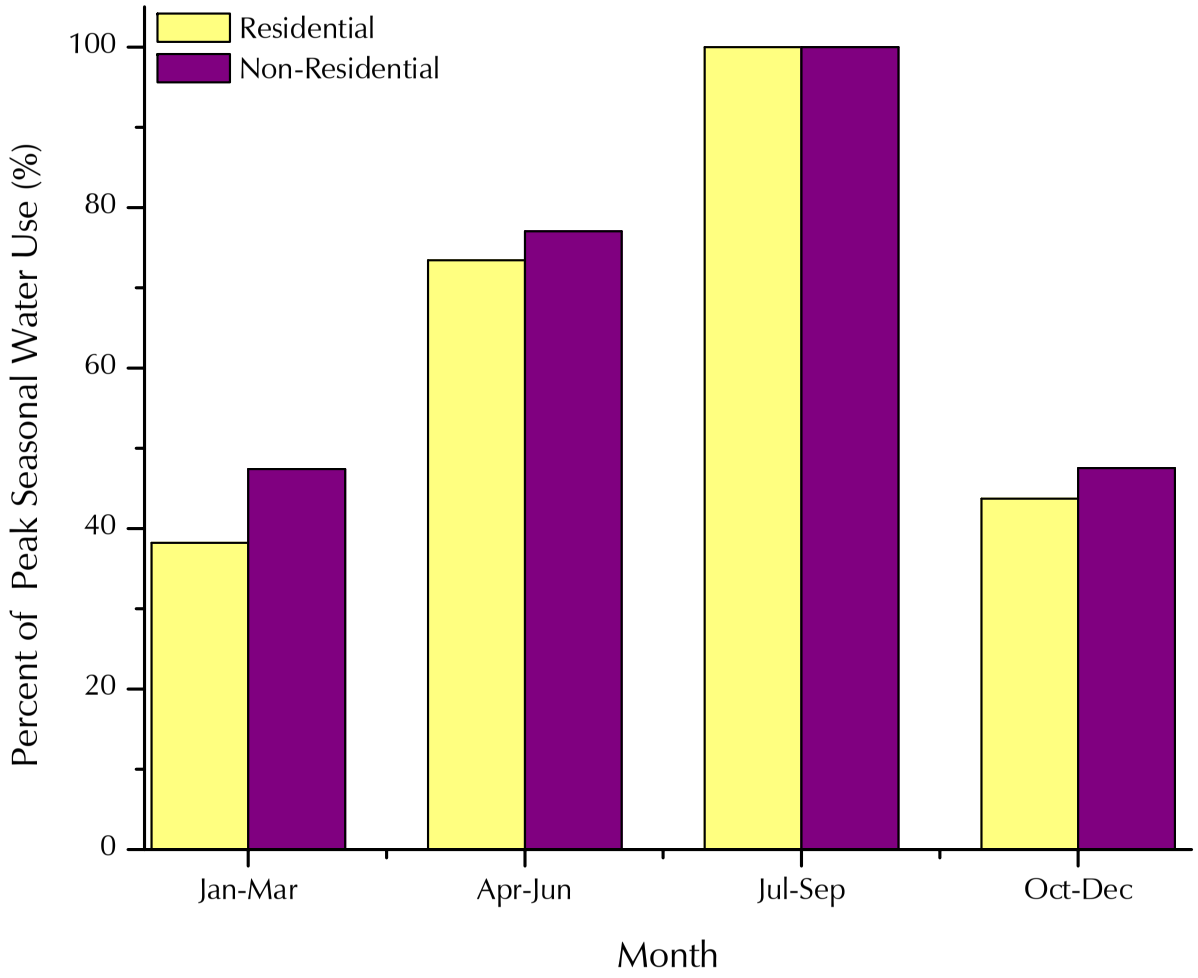

FIGURE 4.8: SEASONAL WATER USE TRENDS
Nags Head Wastewater Management Plan

Source: Town of Nags Head Planning Department, June 2005.
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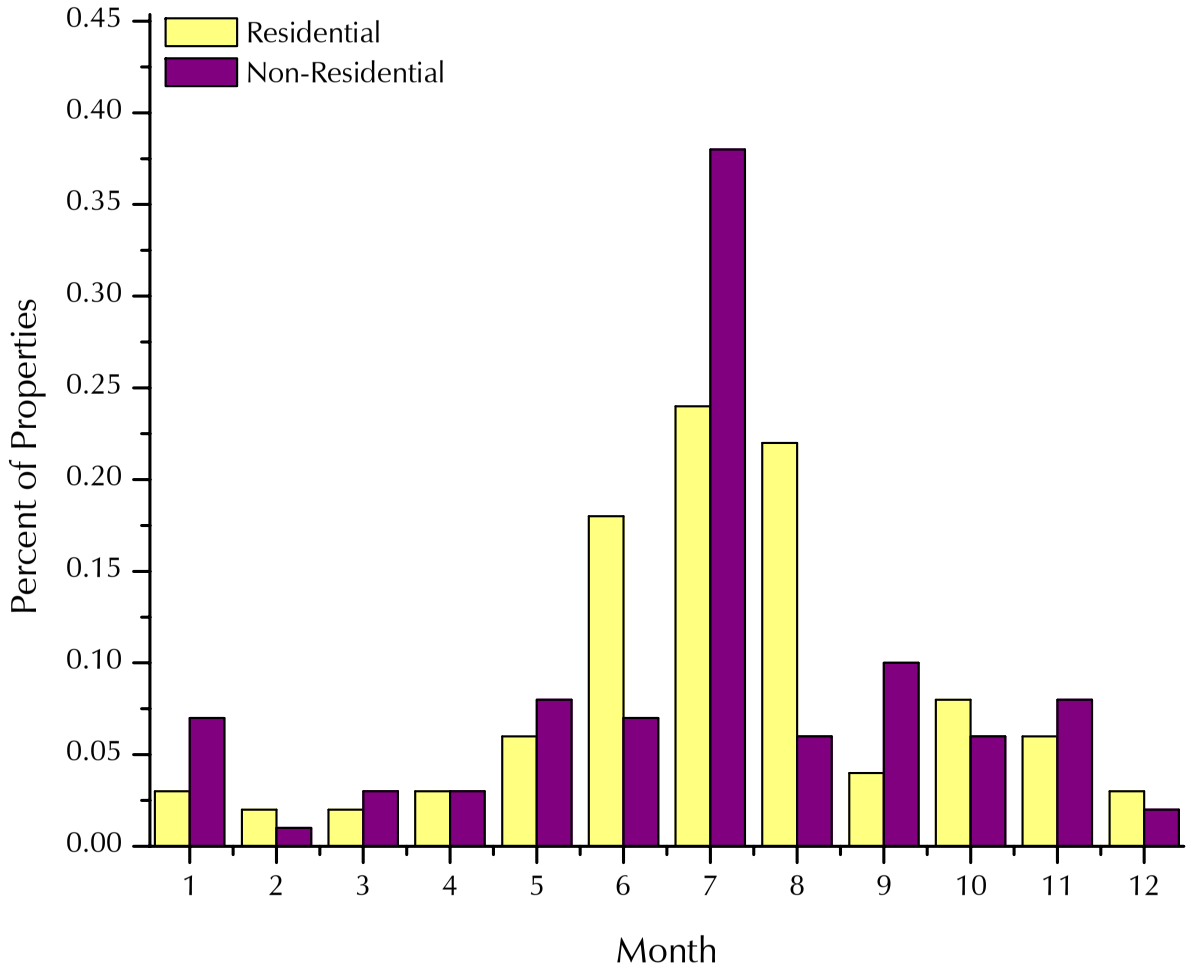

FIGURE 4.9: MONTHS WITH PEAK WATER USE
Nags Head Wastewater Management Plan

Source: Town of Nags Head Planning Department, June 2005.
Path: O:\proj-04\1477-W-NagsHeadNC\Reports\FinalTechnicalReport\Figures\Figure4-9.opj 1/6/2005 djl; rev 6/23/05 anm

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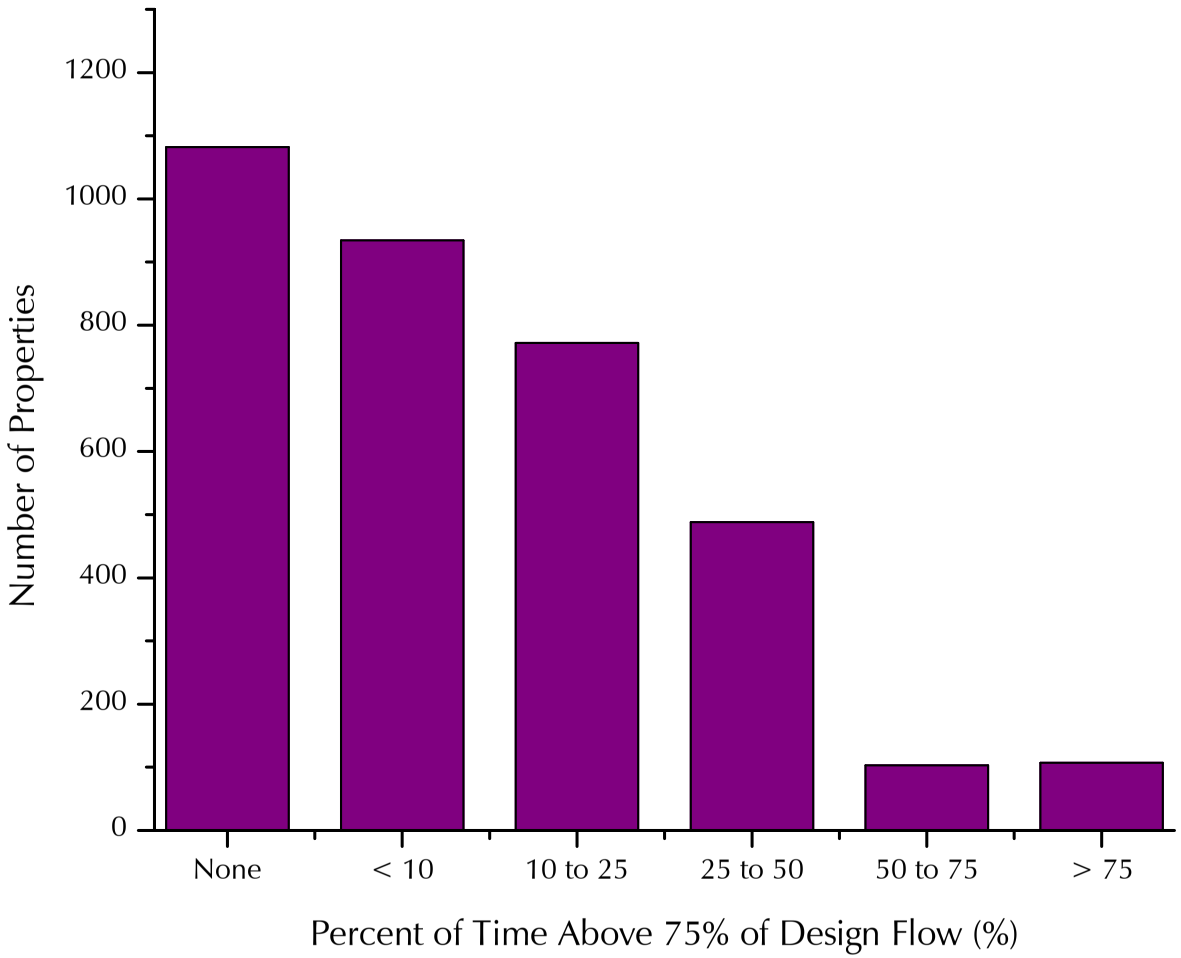


FIGURE 4.10: FREQUENCY OF WATER USE ABOVE 75% of DESIGN FLOW
Nags Head Wastewater Management Plan

Source: Town of Nags Head Planning Department, June 2005.
Path: O:\proj-04\1477-W-NagsHeadNC\Reports\FinalTechnicalReport\Figures\Figure4-10.opj 1/6/2005 djl; rev 6/23/05 anm

STONE ENVIRONMENTAL INC

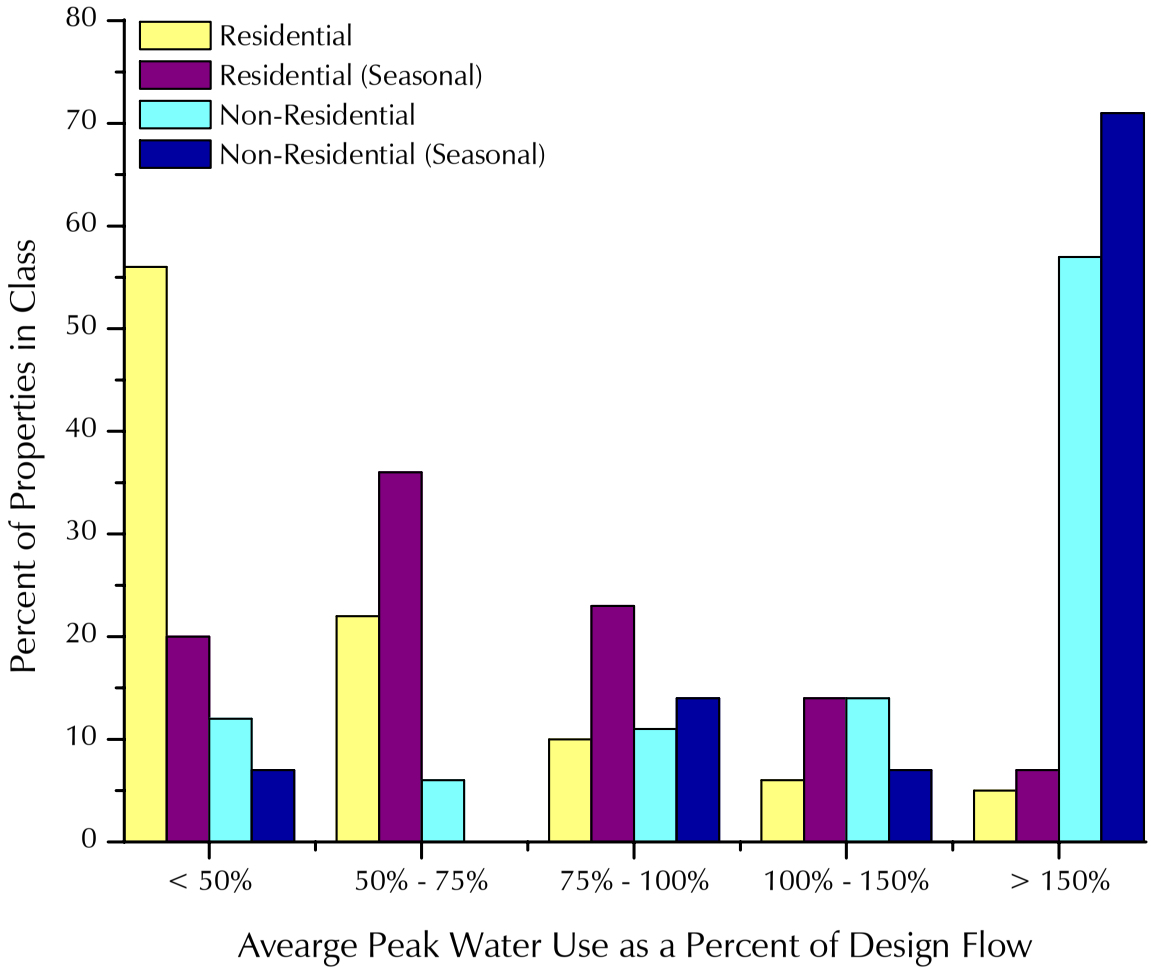
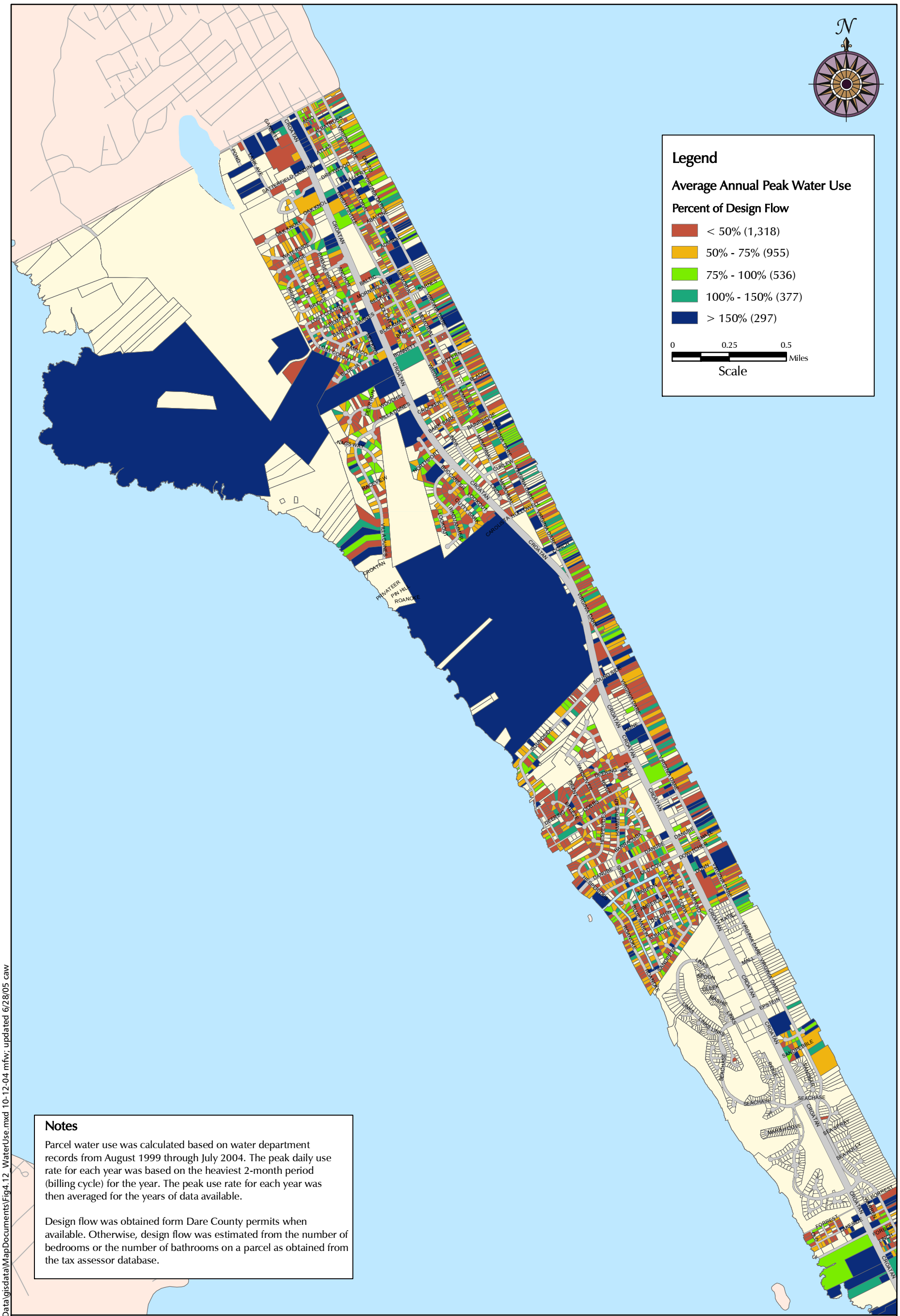


FIGURE 4.11: Disitribution of Average Peak Water Use Rates For Different Property Classes
Nags Head Wastewater Management Program

Source: Town of Nags Head Planning Department, June 2005.
Path: O:\proj-04\1477-W-NagsHeadNC\Reports\FinalTechnicalReport\Figures\Figure4-11.opj 1/6/2005 djl; rev 6/23/05 anm

STONE ENVIRONMENTAL INC



Notes

Parcel water use was calculated based on water department records from August 1999 through July 2004. The peak daily use rate for each year was based on the heaviest 2-month period (billing cycle) for the year. The peak use rate for each year was then averaged for the years of data available.

Design flow was obtained form Dare County permits when available. Otherwise, design flow was estimated from the number of bedrooms or the number of bathrooms on a parcel as obtained from the tax assessor database.

FIGURE 4.12a: PARCEL WATER USE

North Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Parcels fromTown of Nags Head Planning Department, March, 2004;
Design flows, Dare county permit database, August, 2004;
Number of bedrooms and bathrooms, Tax assessment database, May, 2004 .

O:\proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig4.12_WaterUse.mxd 10-12-04 mfw; updated 6/28/05 caw

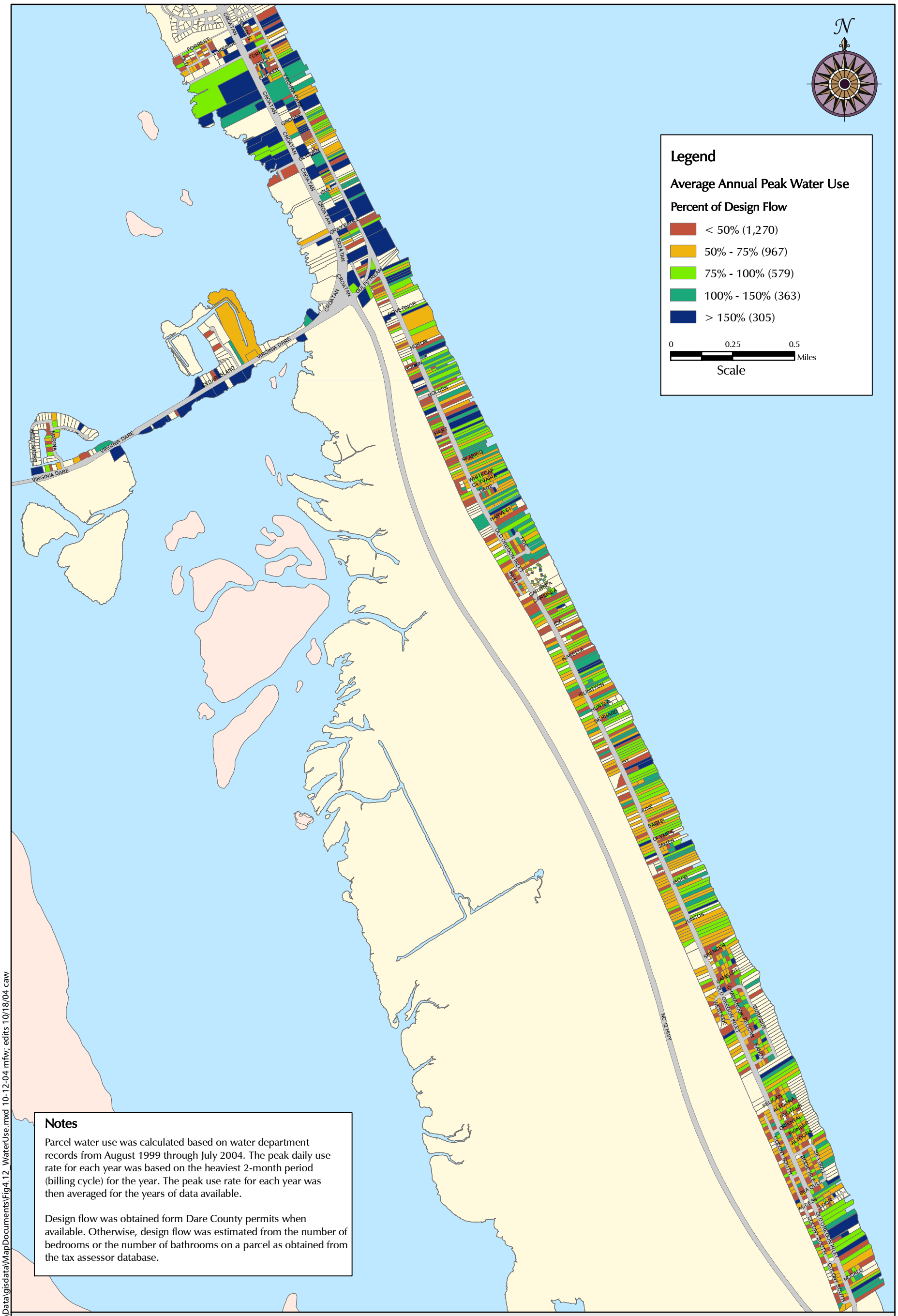


FIGURE 4.12b: PARCEL WATER USE

South Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Parcels fromTown of Nags Head Planning Department, March, 2004;
Design flows, Dare county permit database, August, 2004;
Number of bedrooms and bathrooms, Tax assessment database, May, 2004 .

O:\proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig4.12_WaterUse.mxd 10-12-04 mfw; edits 10/18/04 caw

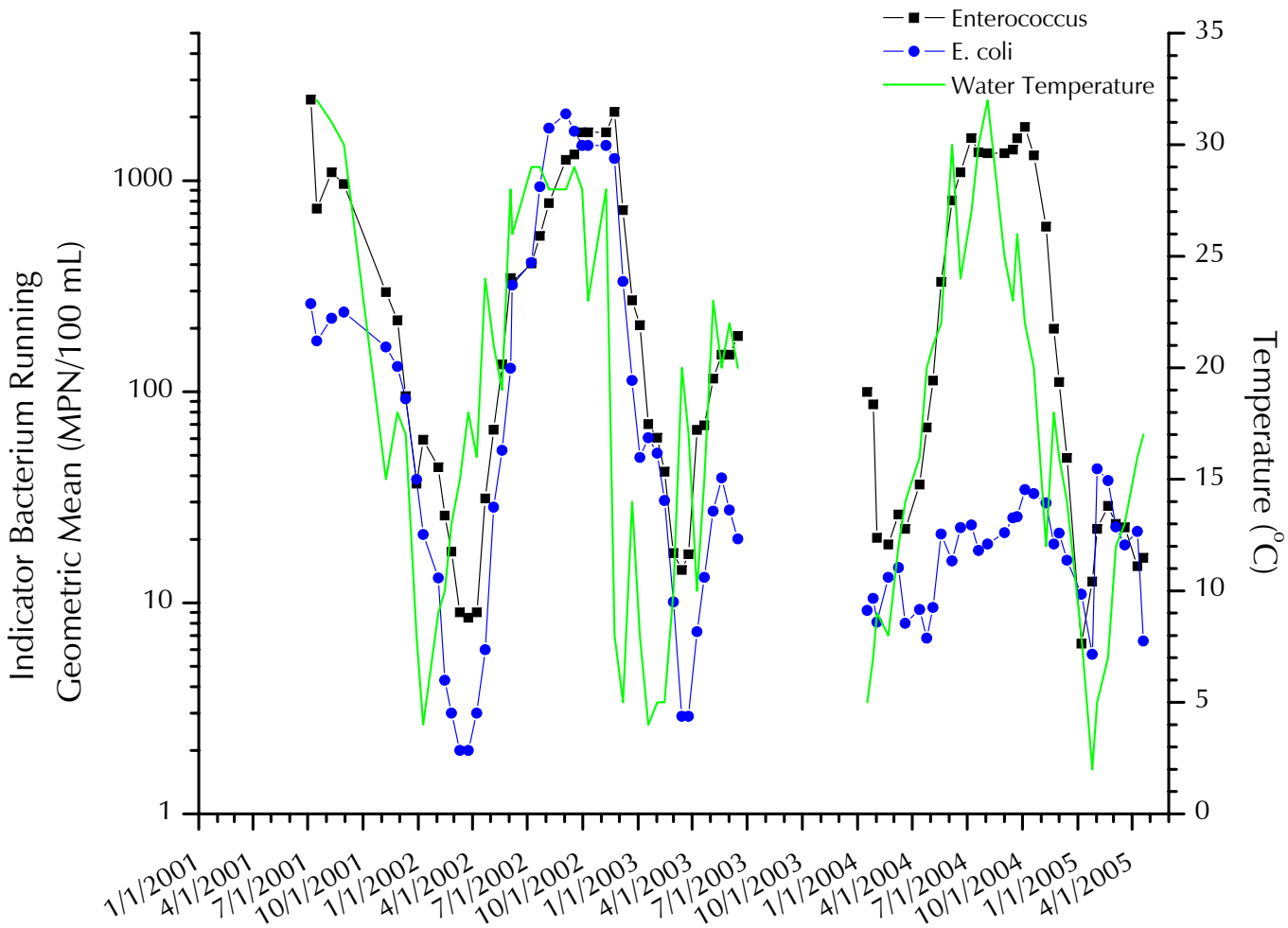


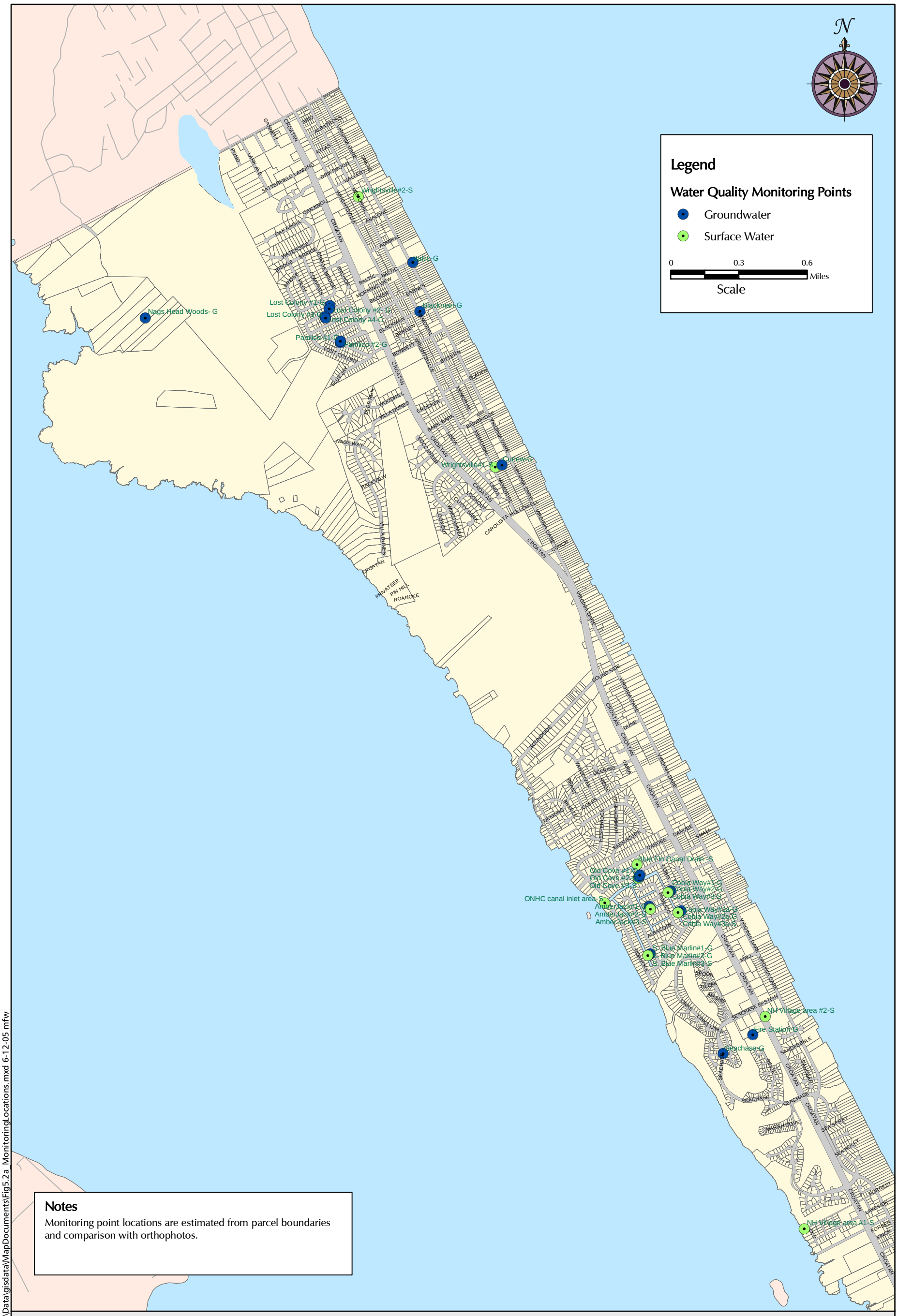
FIGURE 5.1: WATER QUALITY RESULTS FOR FRESH POND

Nags Head Wastewater Management Plan

Source: Town of Nags Head Water Department staff, 2001-2005.

Path: O:\Proj-04\1477-W\Data\FreshPond\Figure5.1.opj 1/6/2005 anm; rev 6/21/05 anm

STONE ENVIRONMENTAL INC



Notes

Monitoring point locations are estimated from parcel boundaries and comparison with orthophotos.

FIGURE 5.2a: WATER QUALITY TESTING PROGRAM SAMPLE LOCATIONS

North Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Parcels and monitoring locations from Town of Nags Head Planning Department, March, 2004;

O:\proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig5.2a_MonitoringLocations.mxd 6-12-05 mfw

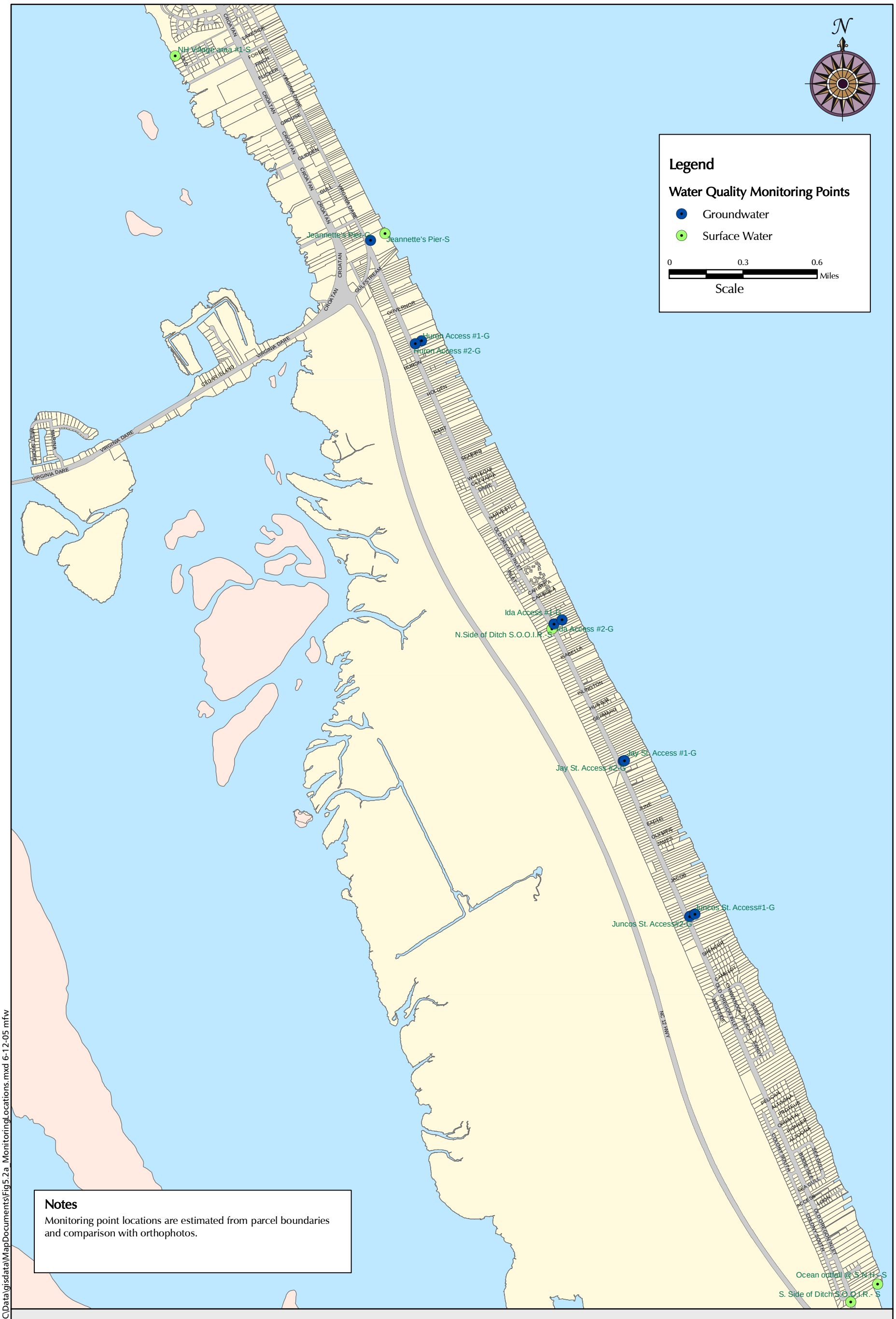
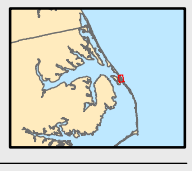


FIGURE 5.2b: WATER QUALITY TESTING PROGRAM SAMPLE LOCATIONS

Location Map



South Nags Head

Nags Head Wastewater Management Program

Source: Parcels and monitoring locations from Town of Nags Head Planning Department, March, 2004;

O:\proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig5.2a_MonitoringLocations.mxd 6-12-05 mfw

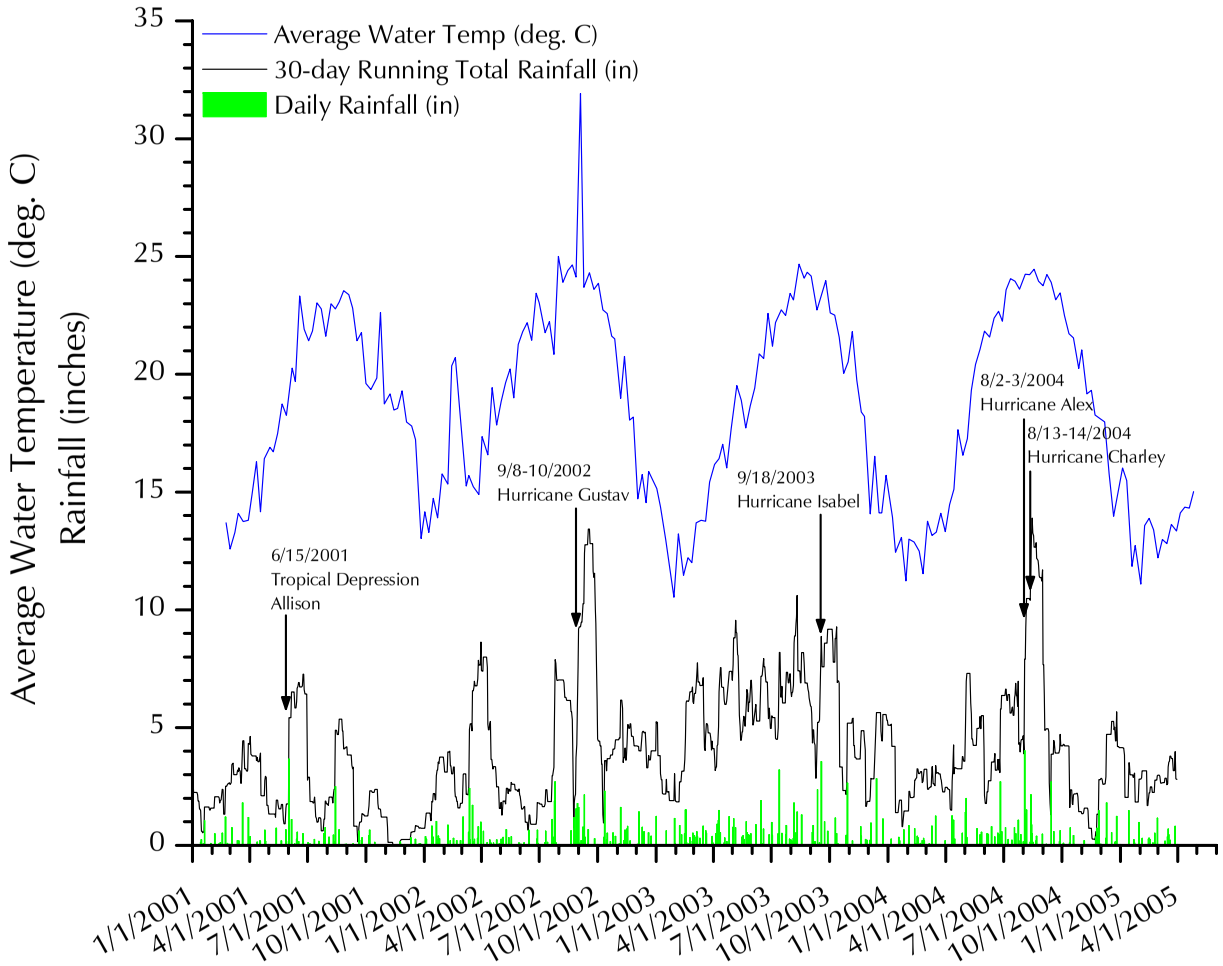
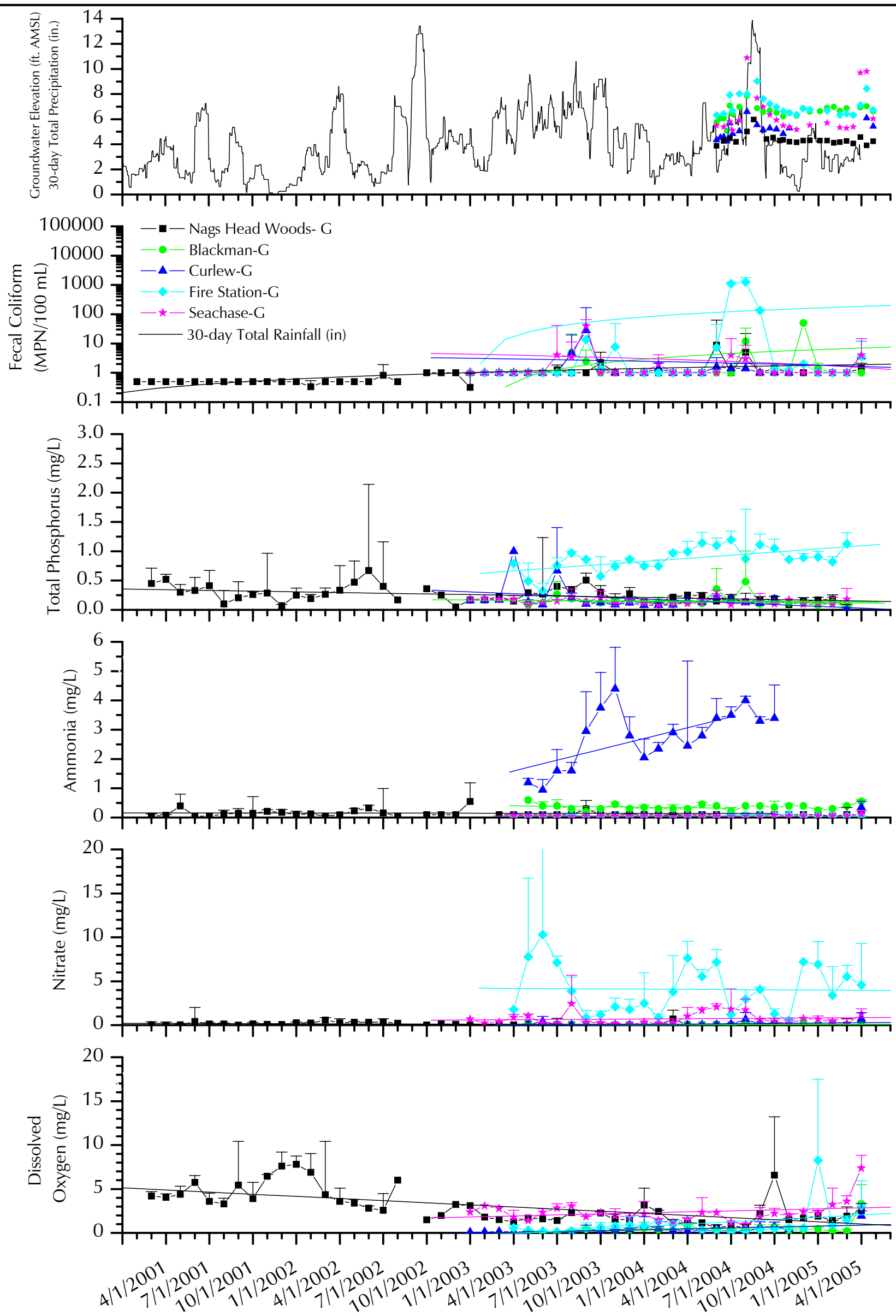


FIGURE 5.3: AVERAGE WATER TEMPERATURE AND PRECIPITATION DATA
Nags Head Wastewater Management Plan

Source: Precipitation data, National Climate Data Center; water temperature, Town of Nags Head staff, 2001-2005.
Path: O:\Proj-04\1477-W\Data\Weather\Figure5.x.opj 6/22/05 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

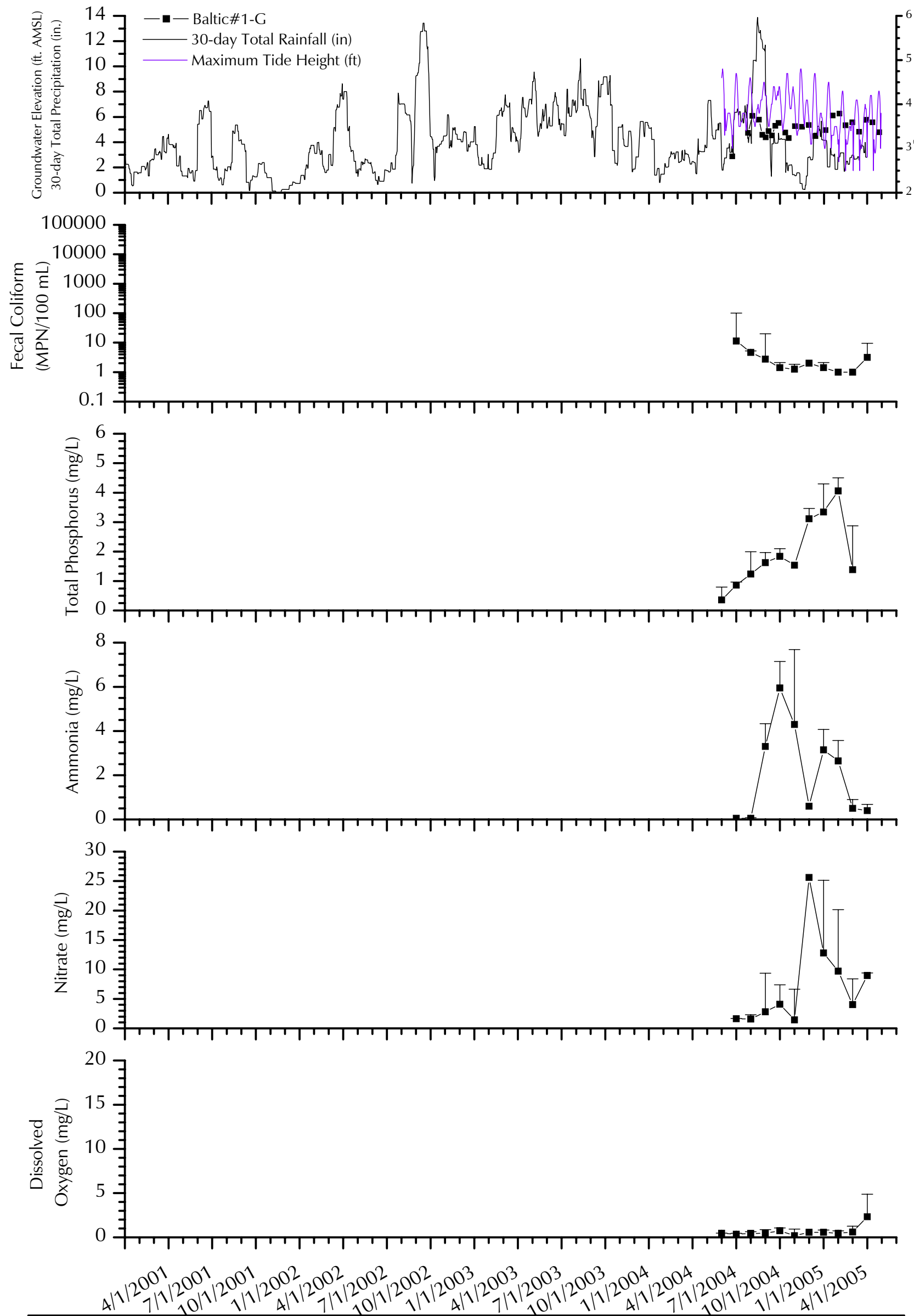
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.4: WATER QUALITY RESULTS BY MONTH, GROUNDWATER WELLS NOT INFLUENCED BY ONSITE SYSTEMS

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/16/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

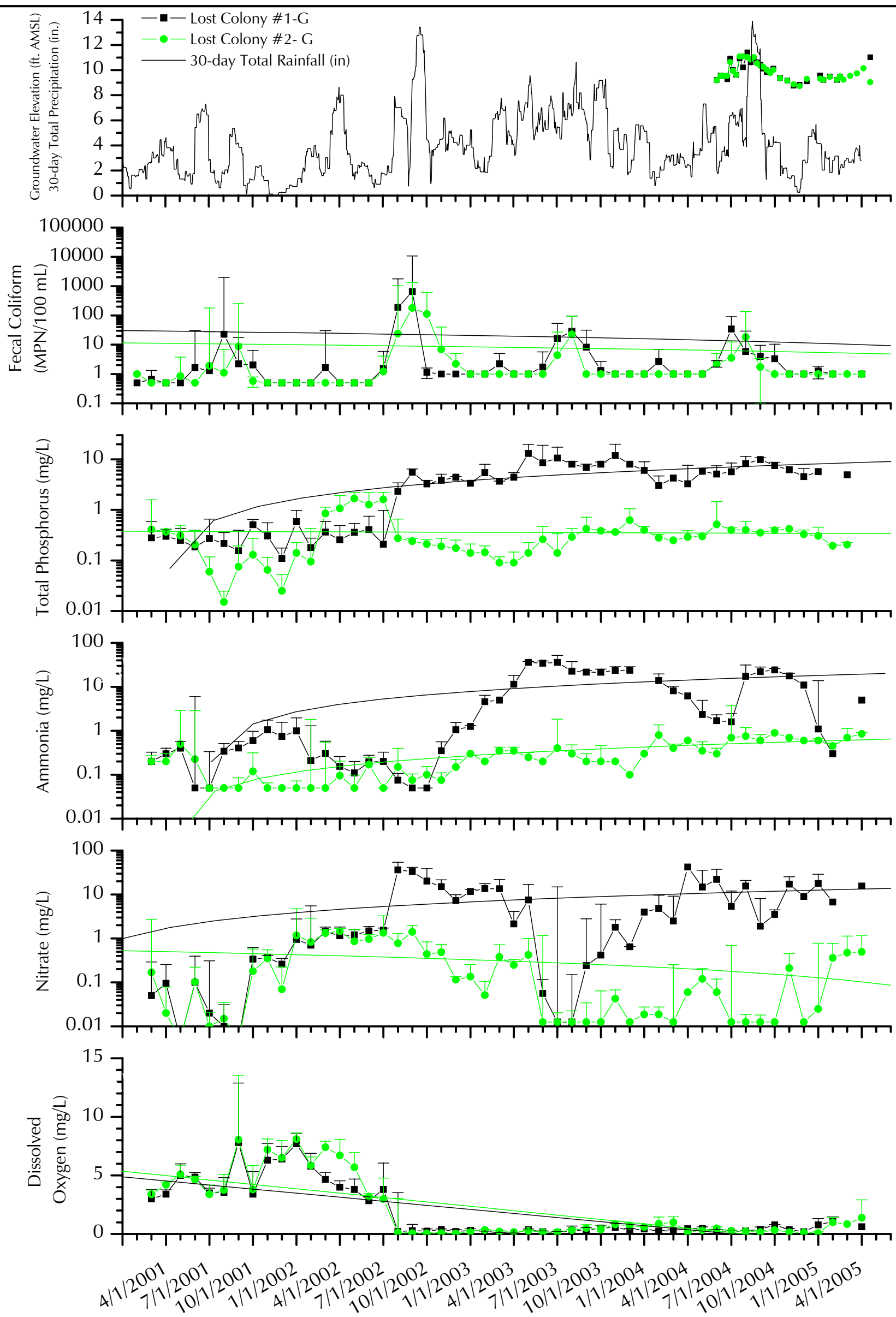
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.5: WATER QUALITY RESULTS BY MONTH, BALTIC SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/16/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

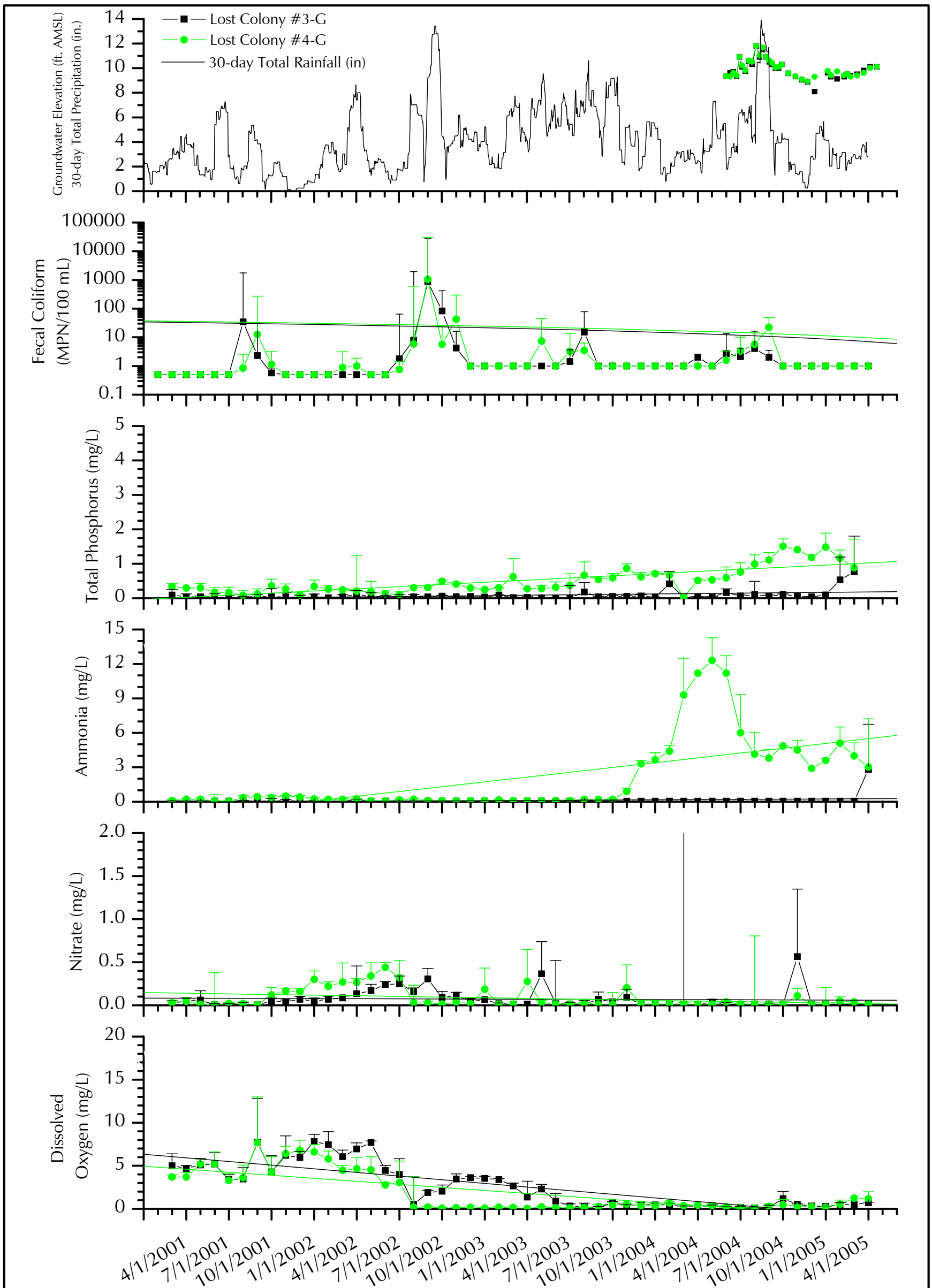
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.6: WATER QUALITY RESULTS BY MONTH, LOST COLONY 1 SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/16/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

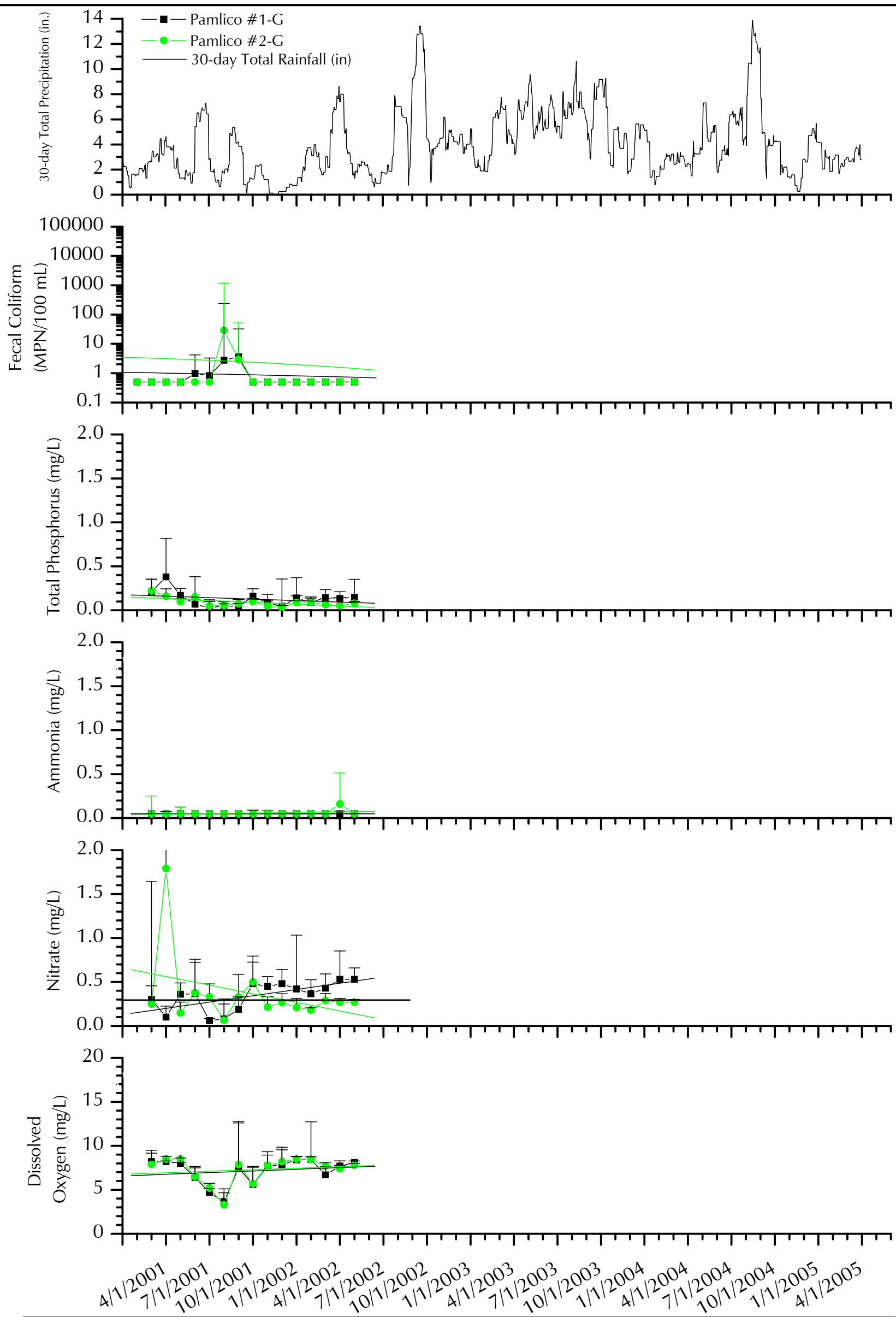
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.7: WATER QUALITY RESULTS BY MONTH, LOST COLONY 2 SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/16/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

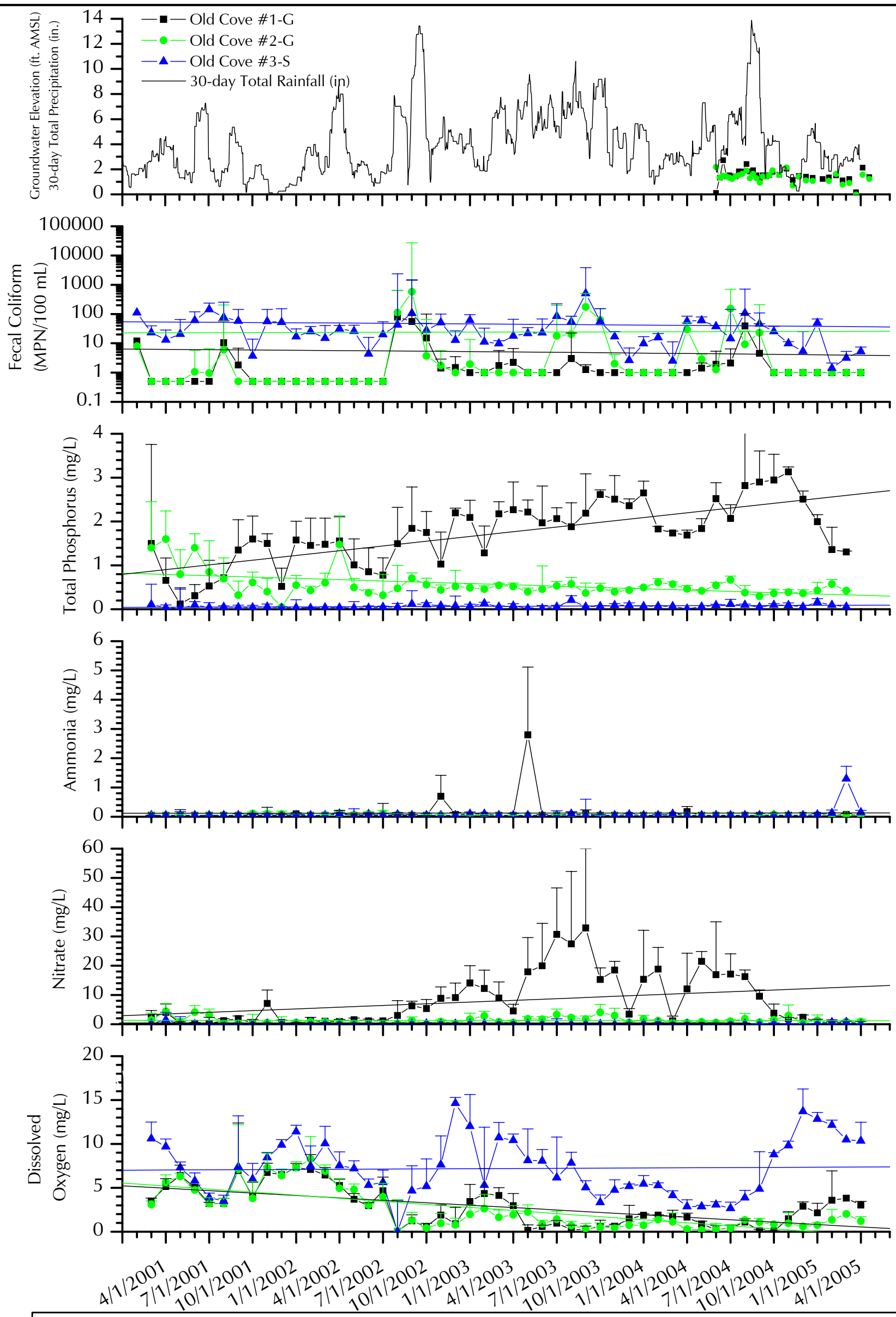
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.8: WATER QUALITY RESULTS BY MONTH, PAMLICO SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/16/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

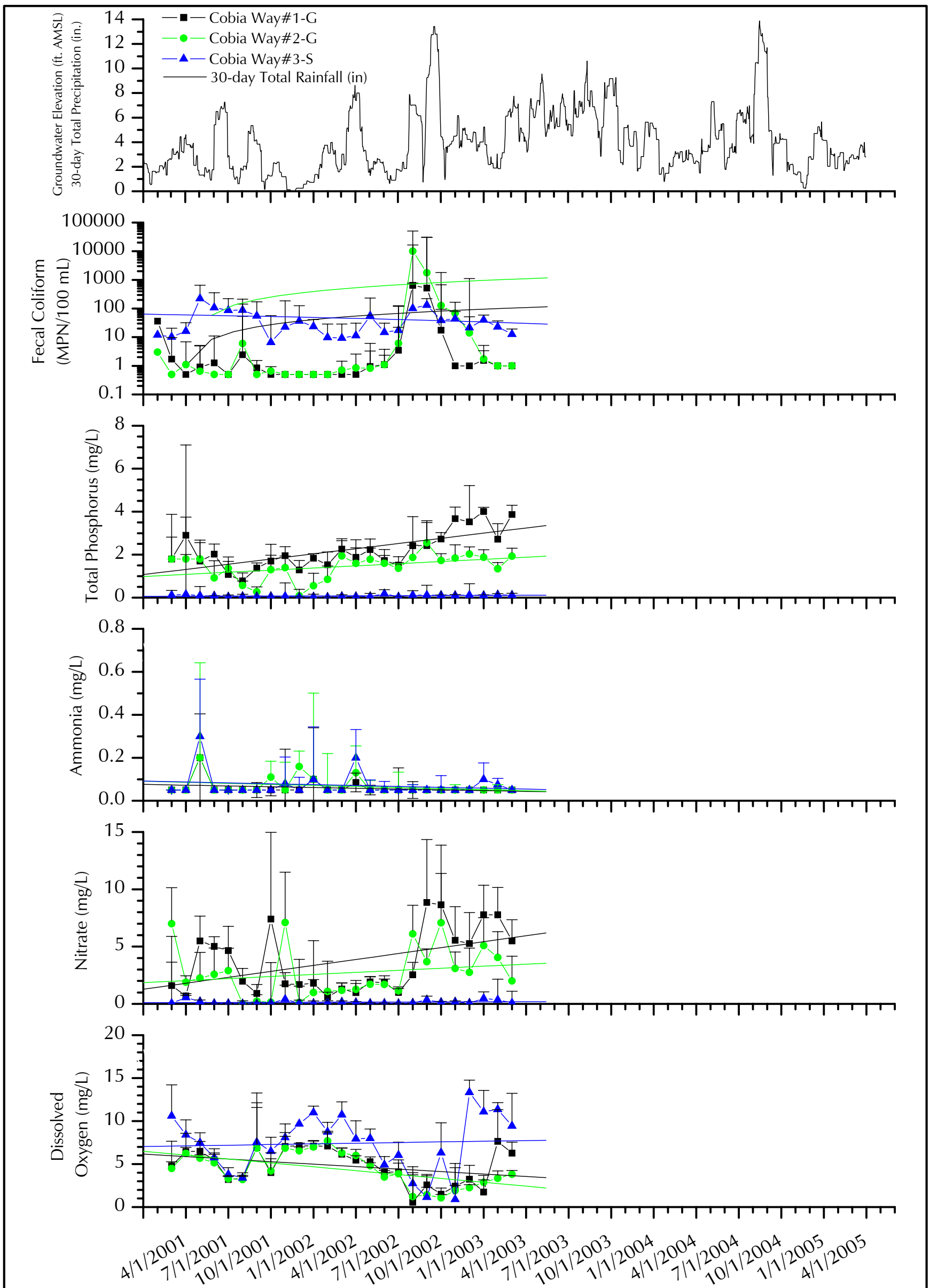
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.9: WATER QUALITY RESULTS BY MONTH, OLD COVE SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/16/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

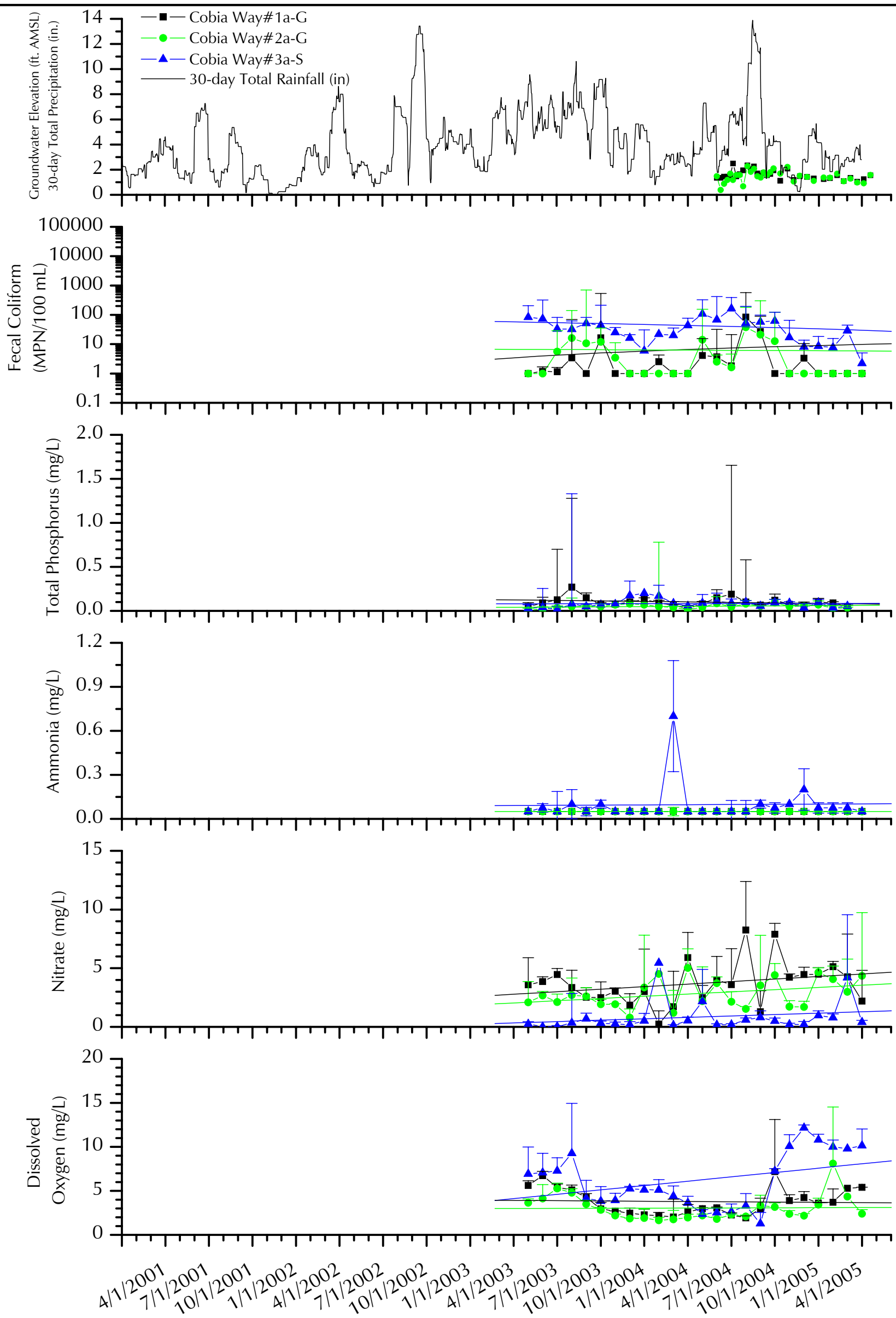
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.10: WATER QUALITY RESULTS BY MONTH, COBIA WAY SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

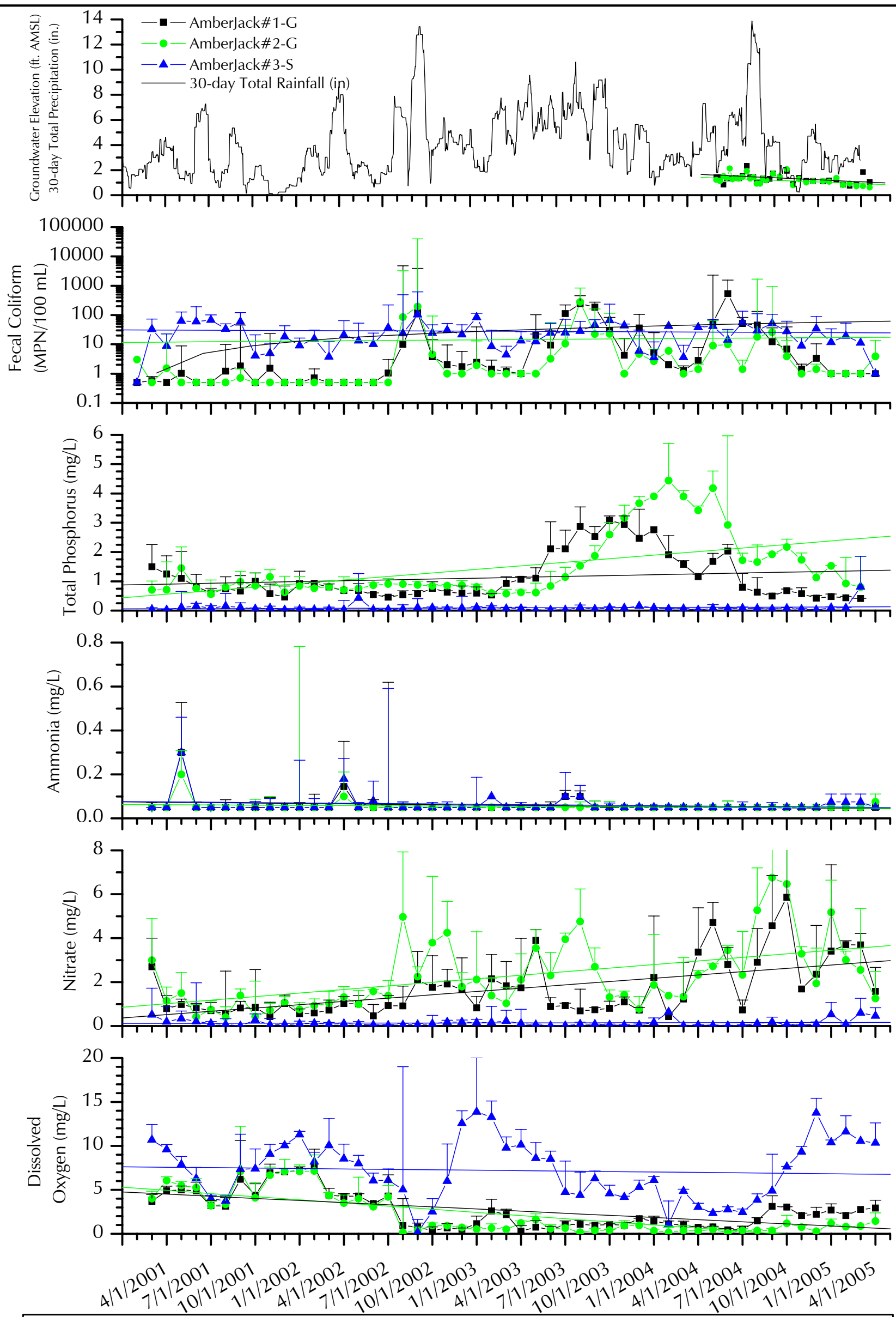
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.11: WATER QUALITY RESULTS BY MONTH, COBIA WAY "A" SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

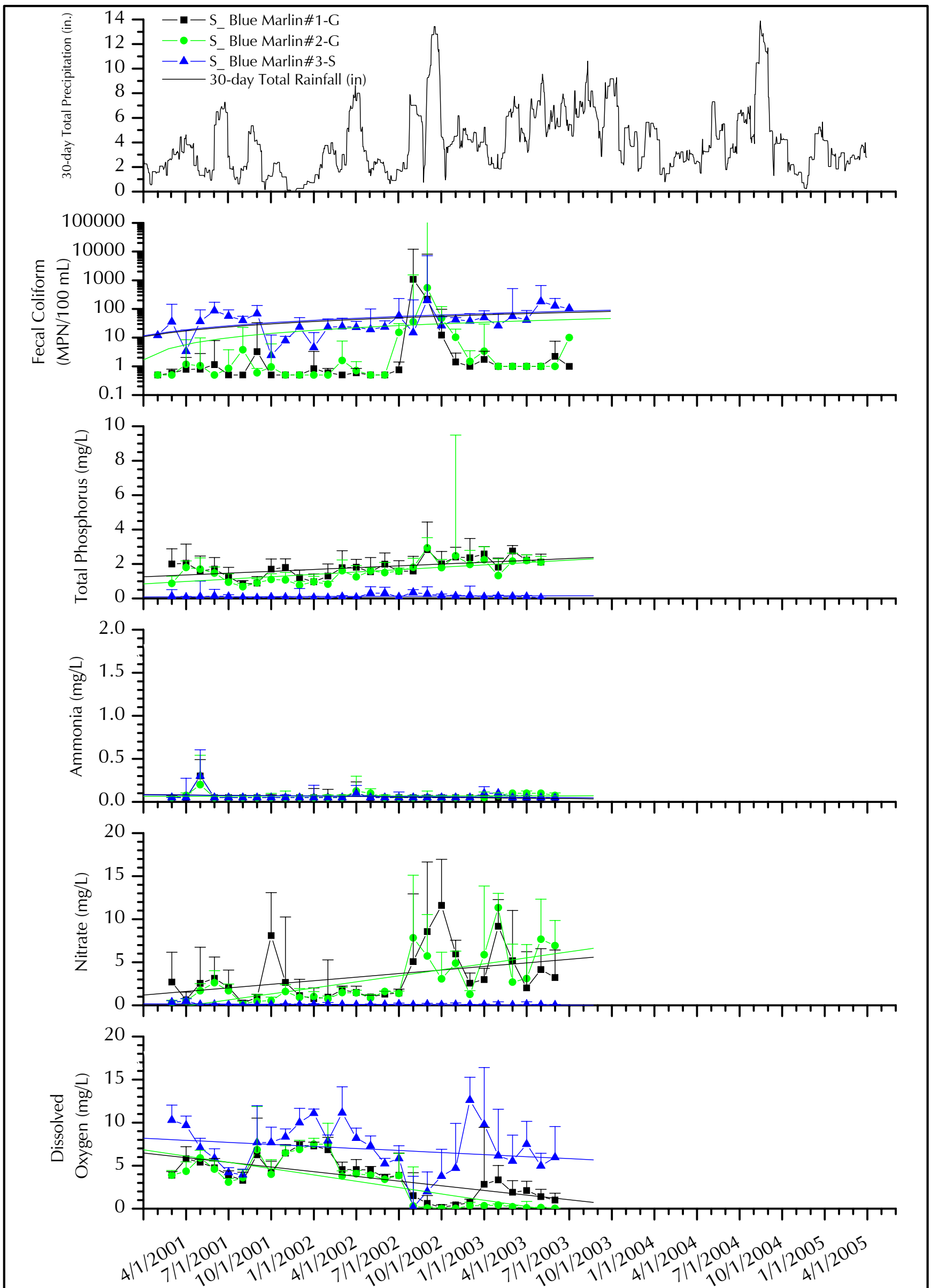
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.12: WATER QUALITY RESULTS BY MONTH, AMBERJACK SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

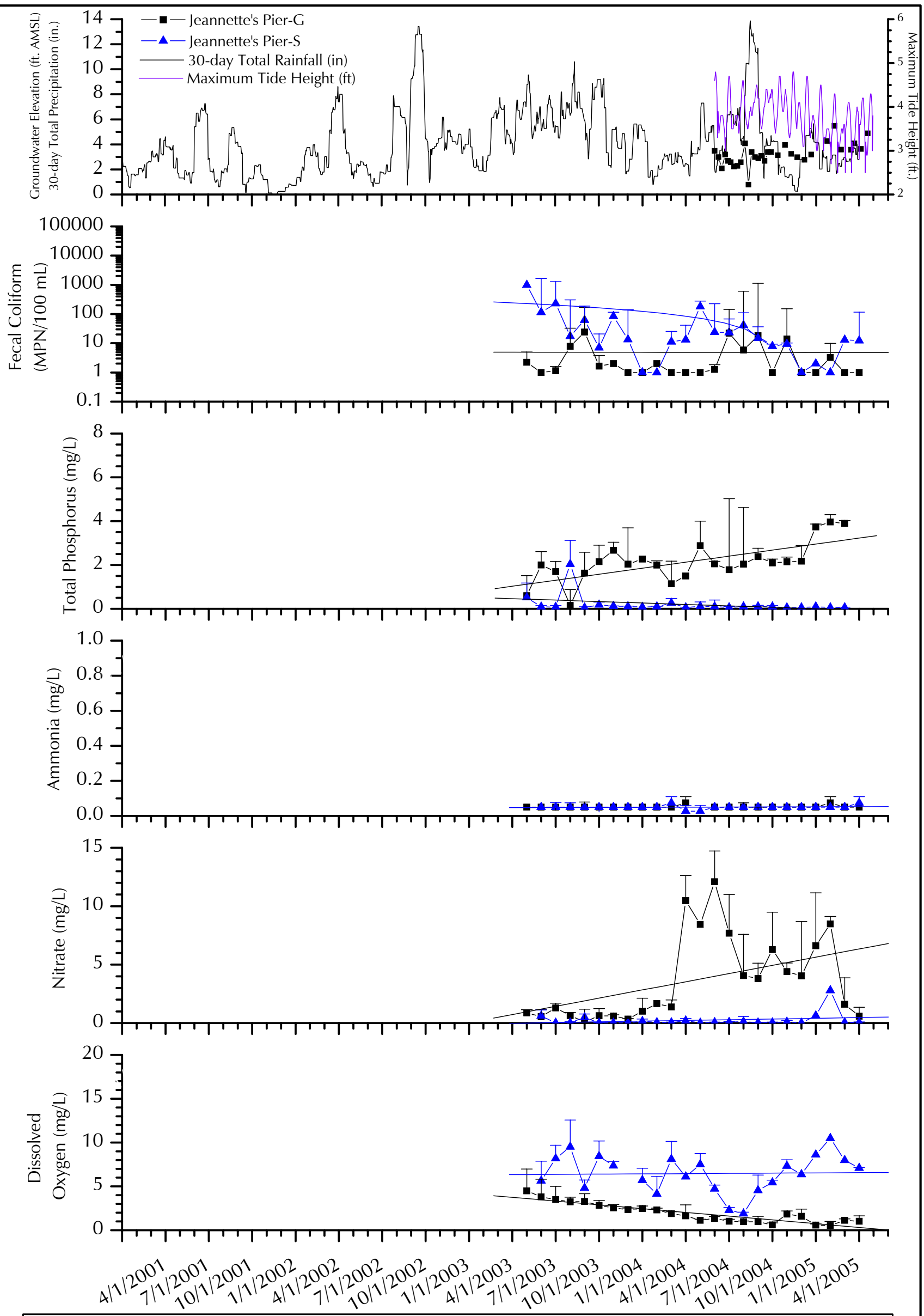
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.13: WATER QUALITY RESULTS BY MONTH, SOUTH BLUE MARLIN SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

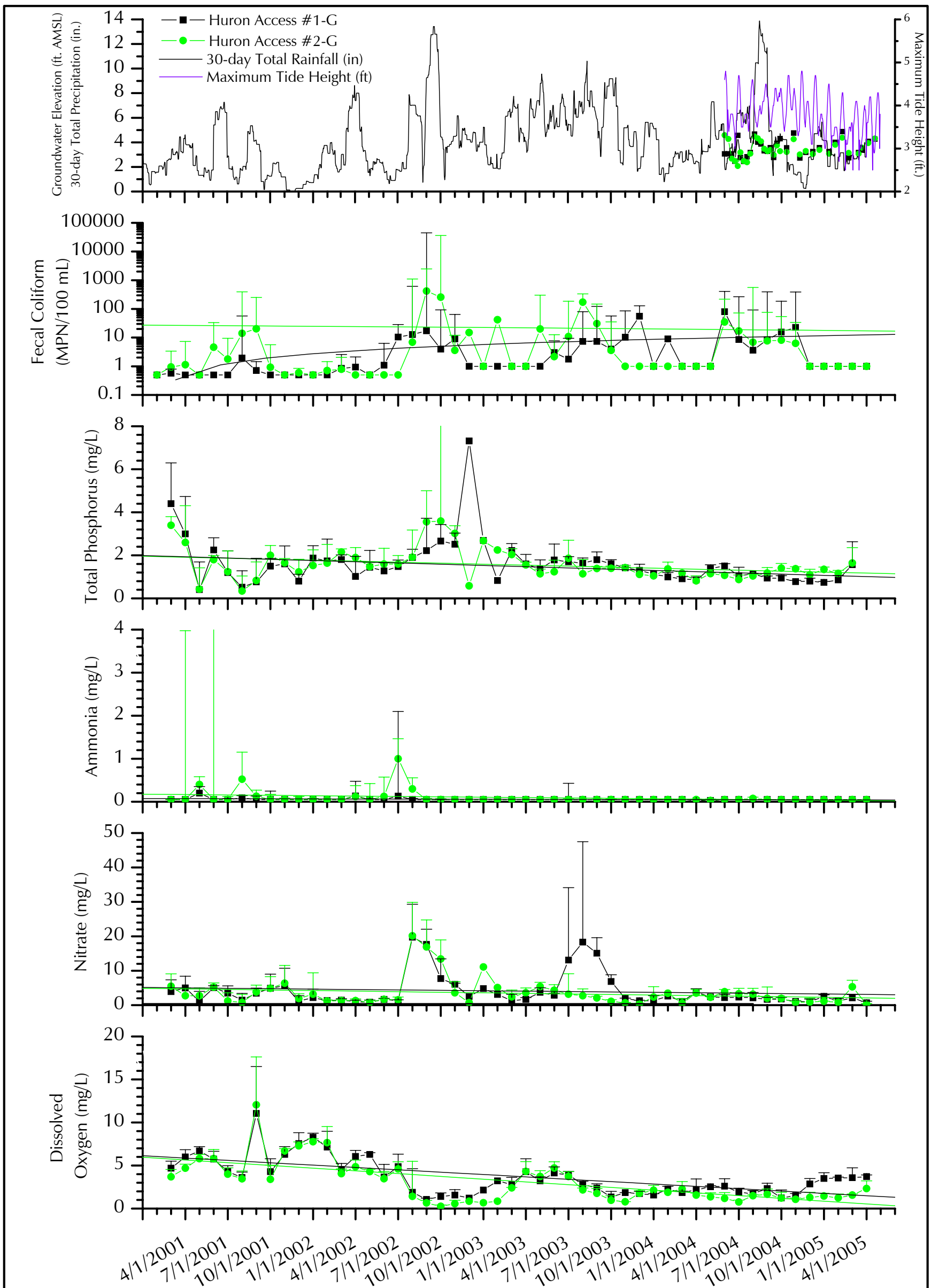
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.14: WATER QUALITY RESULTS BY MONTH, JEANNETTE'S PIER SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

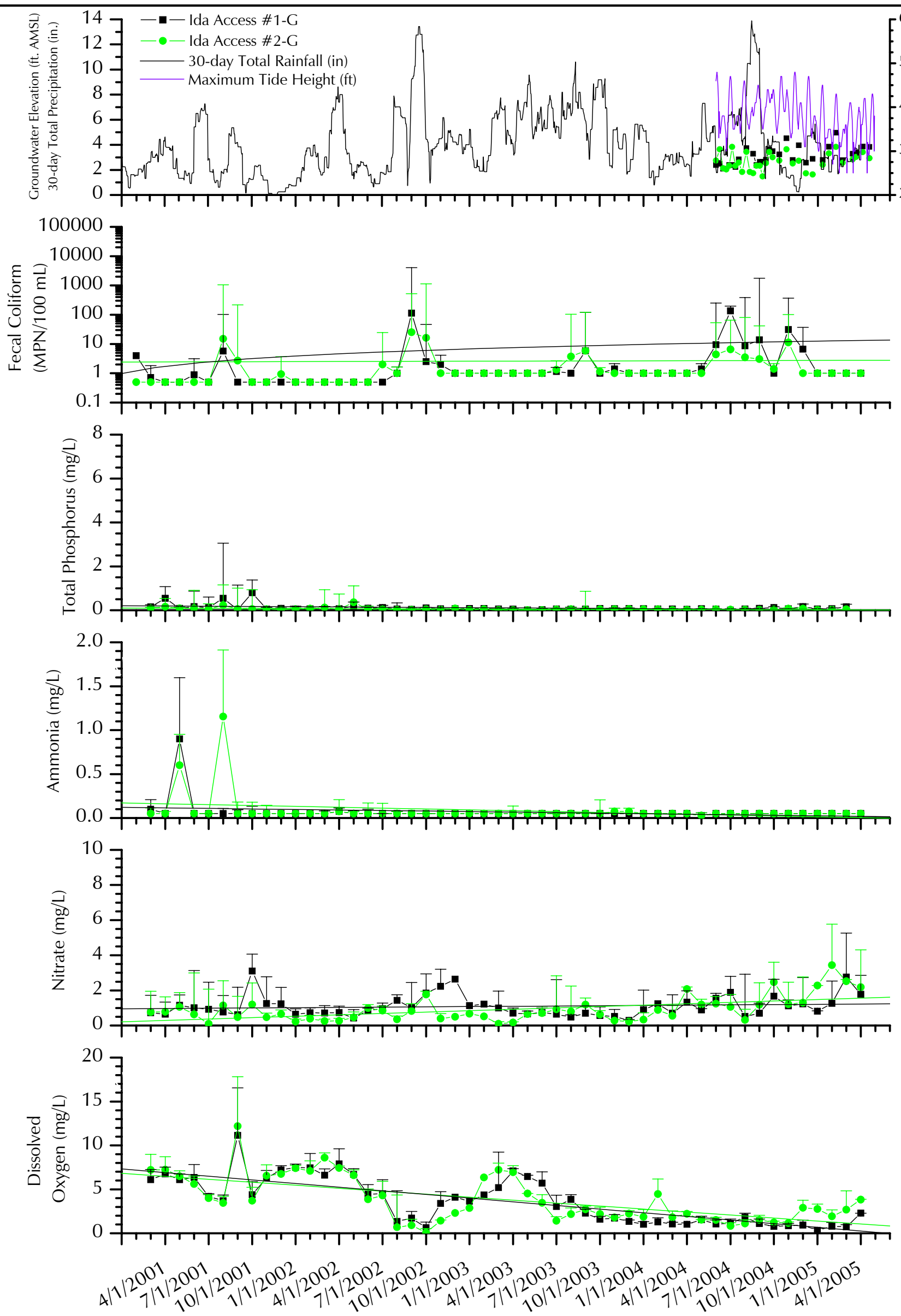
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.13: WATER QUALITY RESULTS BY MONTH, HURON ACCESS SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

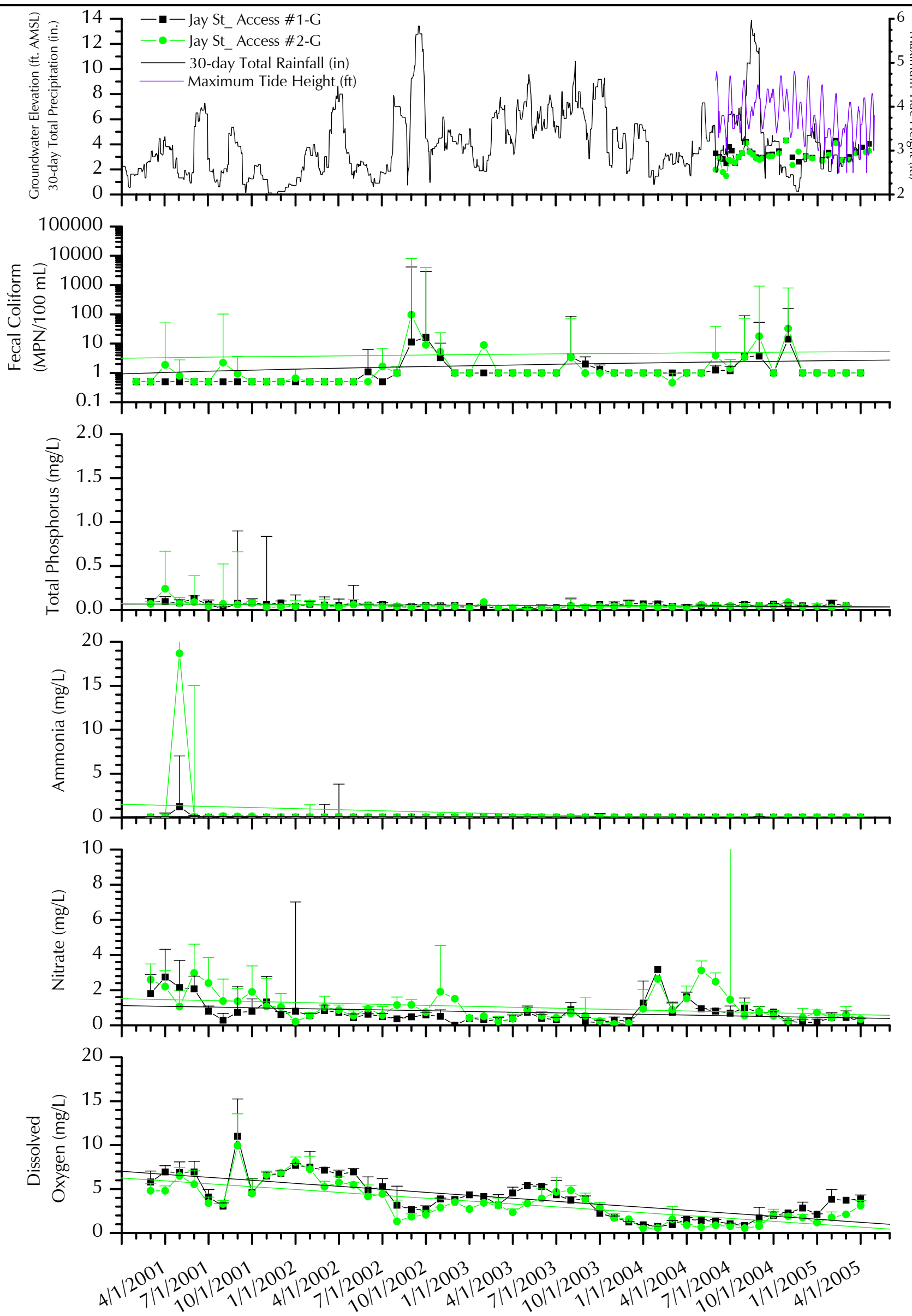
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.16: WATER QUALITY RESULTS BY MONTH, IDA ACCESS SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

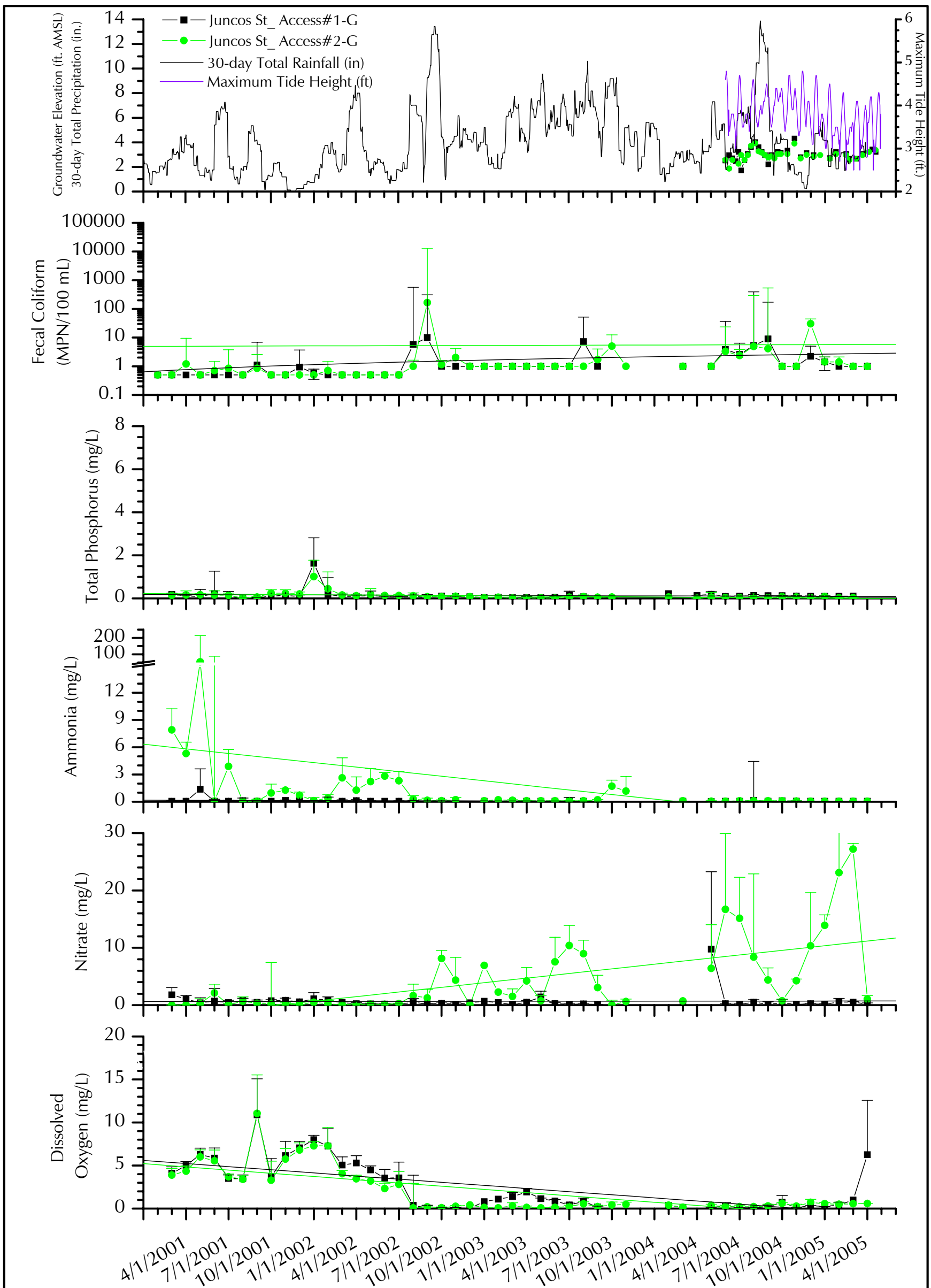
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.17: WATER QUALITY RESULTS BY MONTH, JAY STREET ACCESS SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

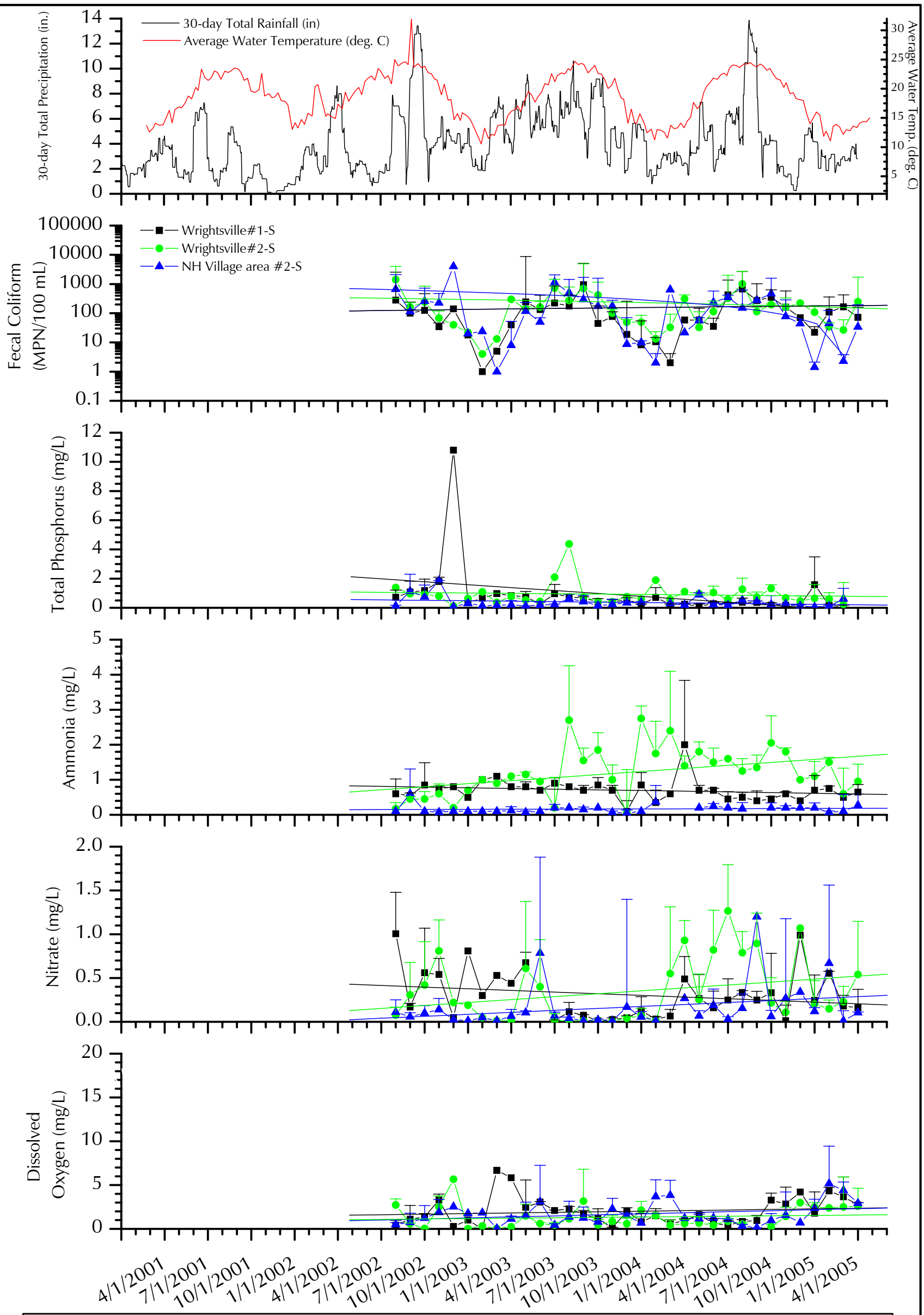
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.18: WATER QUALITY RESULTS BY MONTH, JUNCOS STREET ACCESS SERIES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

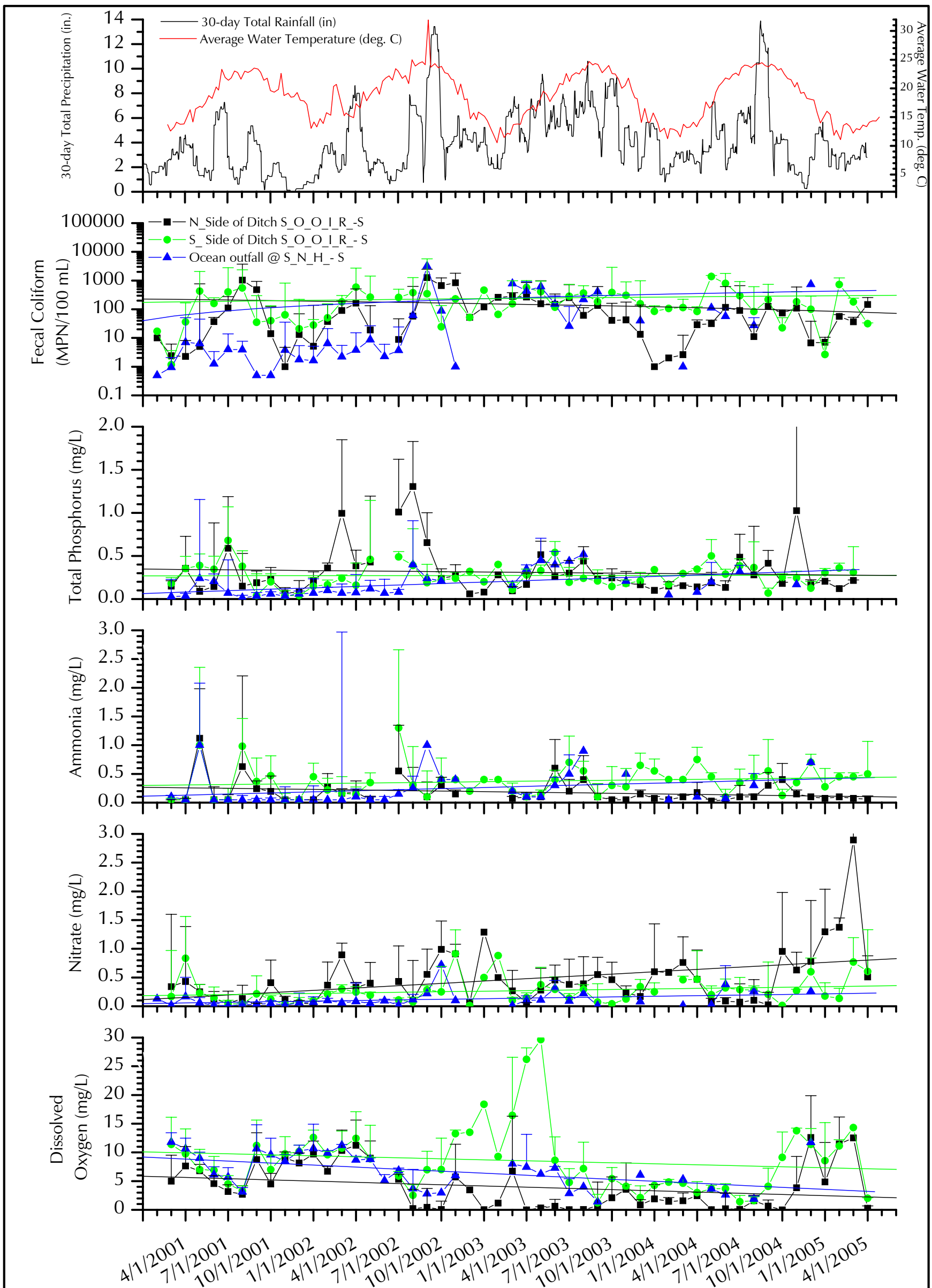
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.19: WATER QUALITY RESULTS BY MONTH, NORTHERN DITCHES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

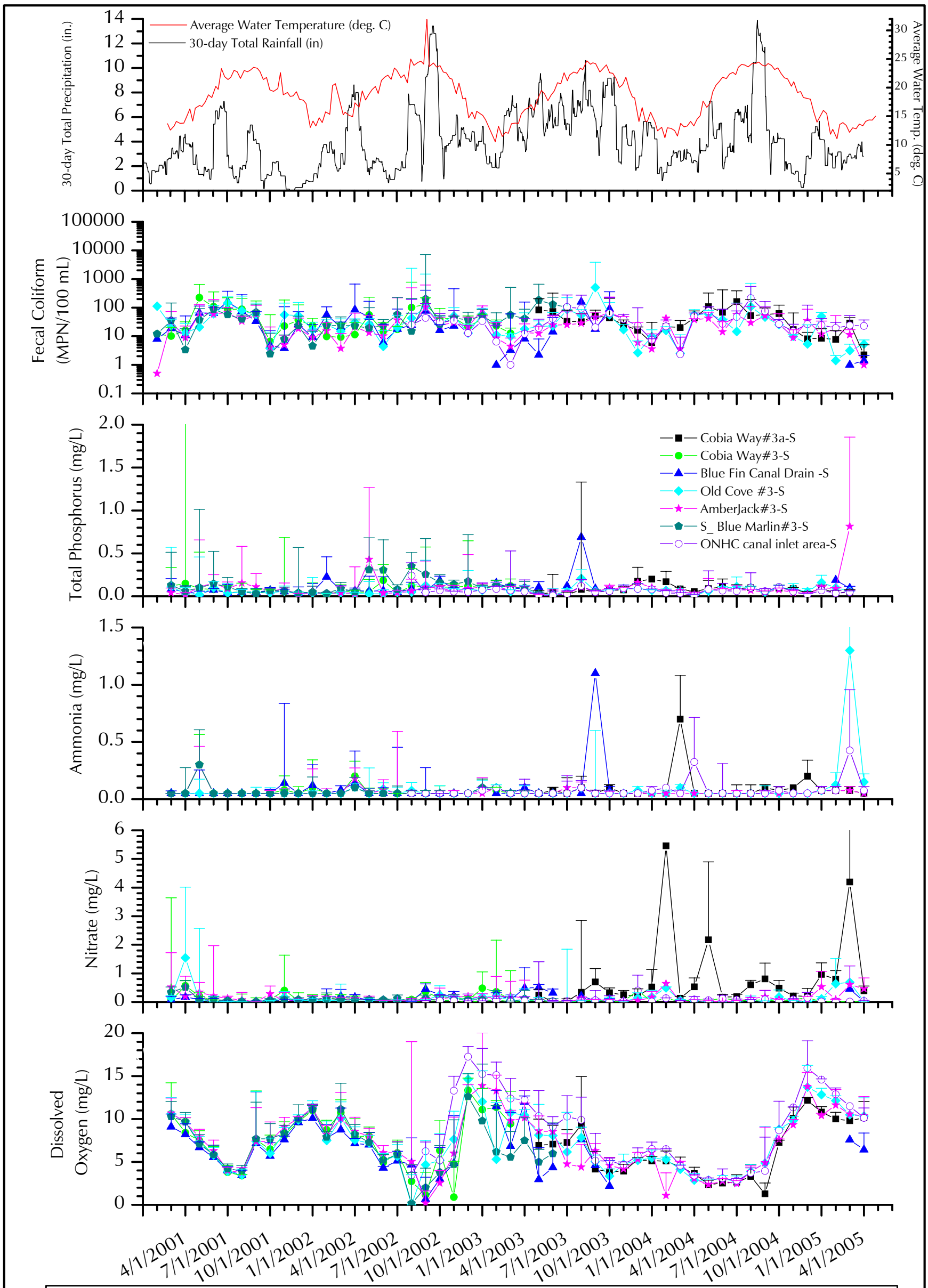
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.20: WATER QUALITY RESULTS BY MONTH, SOUTHERN DITCHES

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

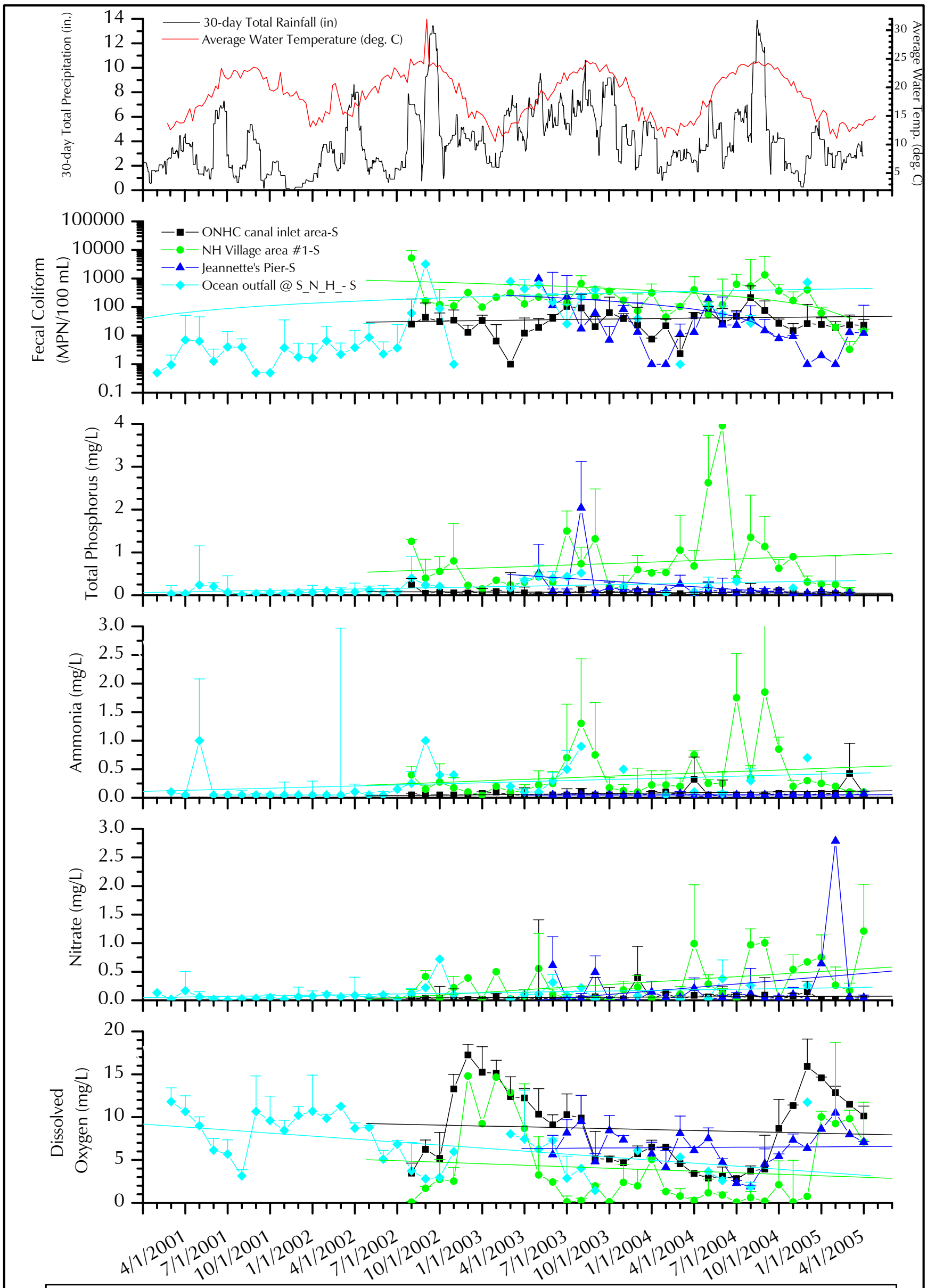
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.21: WATER QUALITY RESULTS BY MONTH, SURFACE WATER FINGER CANALS

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes:

Points represent actual values for 30-day total precipitation and groundwater elevations, monthly geometric means for fecal coliform, and monthly medians for all other water quality parameters.

Vertical bars represent one standard deviation (shown in positive direction only).

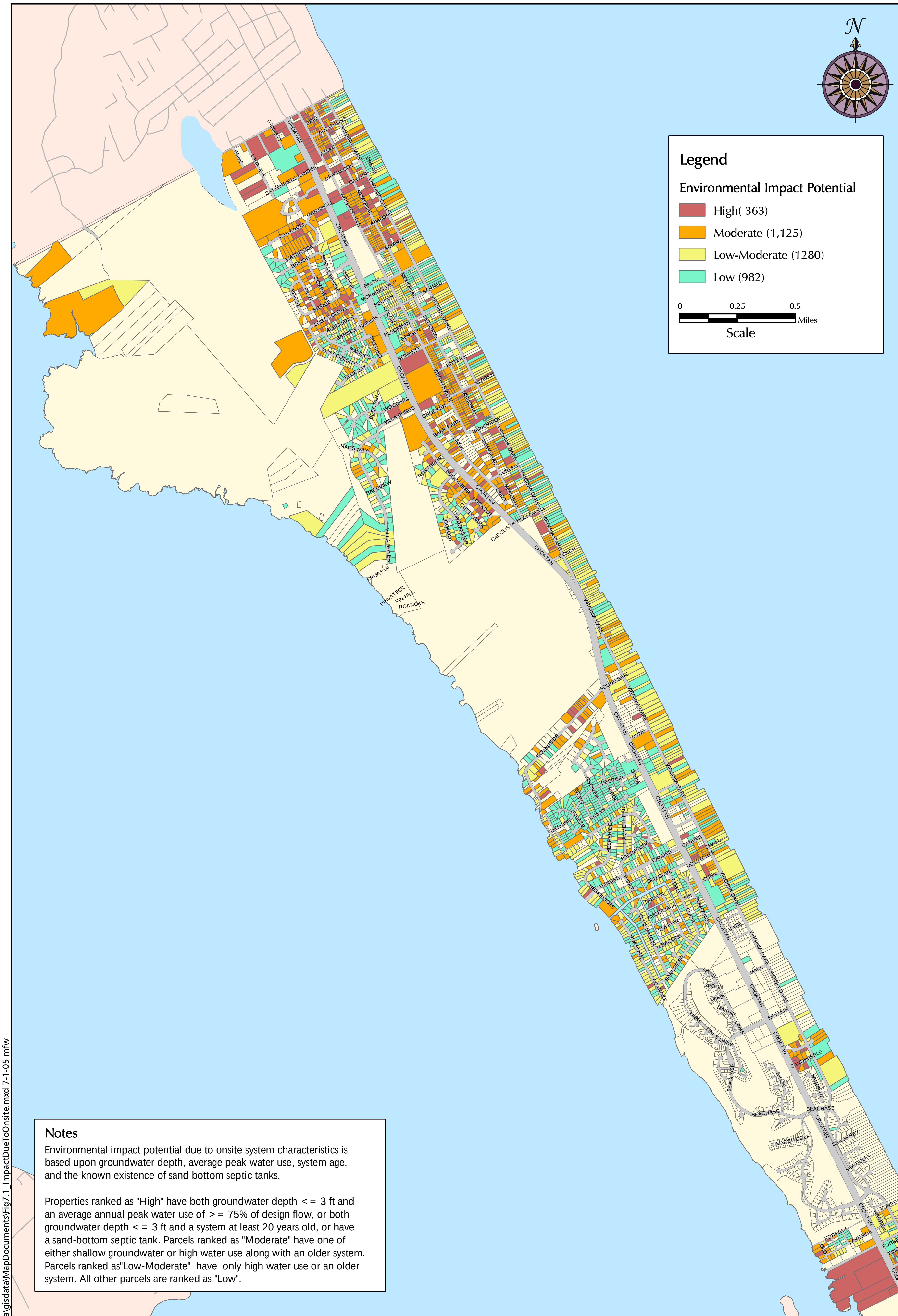
Linear trends for each data series over the monitoring period are shown as straight lines.

FIGURE 5.22: WATER QUALITY RESULTS BY MONTH, RECEIVING WATERS

Nags Head Wastewater Management Program

Source: Town of Nags Head Water Quality Sampling Program, 2001-2005.
Path: O:\Proj-04\1477-W\Data\WaterQualityGraphs\Question1.opj 6/17/2005 anm

STONE ENVIRONMENTAL INC



Notes

Environmental impact potential due to onsite system characteristics is based upon groundwater depth, average peak water use, system age, and the known existence of sand bottom septic tanks.

Properties ranked as "High" have both groundwater depth <= 3 ft and an average annual peak water use of >= 75% of design flow, or both groundwater depth <= 3 ft and a system at least 20 years old, or have a sand-bottom septic tank. Parcels ranked as "Moderate" have one of either shallow groundwater or high water use along with an older system. Parcels ranked as"Low-Moderate" have only high water use or an older system. All other parcels are ranked as "Low".

FIGURE 7.1a: ENVIRONMENTAL IMPACT POTENTIAL: ONSITE SYSTEM CHARACTERISTICS
North Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Potential Environmental Impact Due to Onsite System Characteristics, SEI, June, 2005.

O:\proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig7.1_ImpactDueToOnsite.mxd 7-1-05 mfw

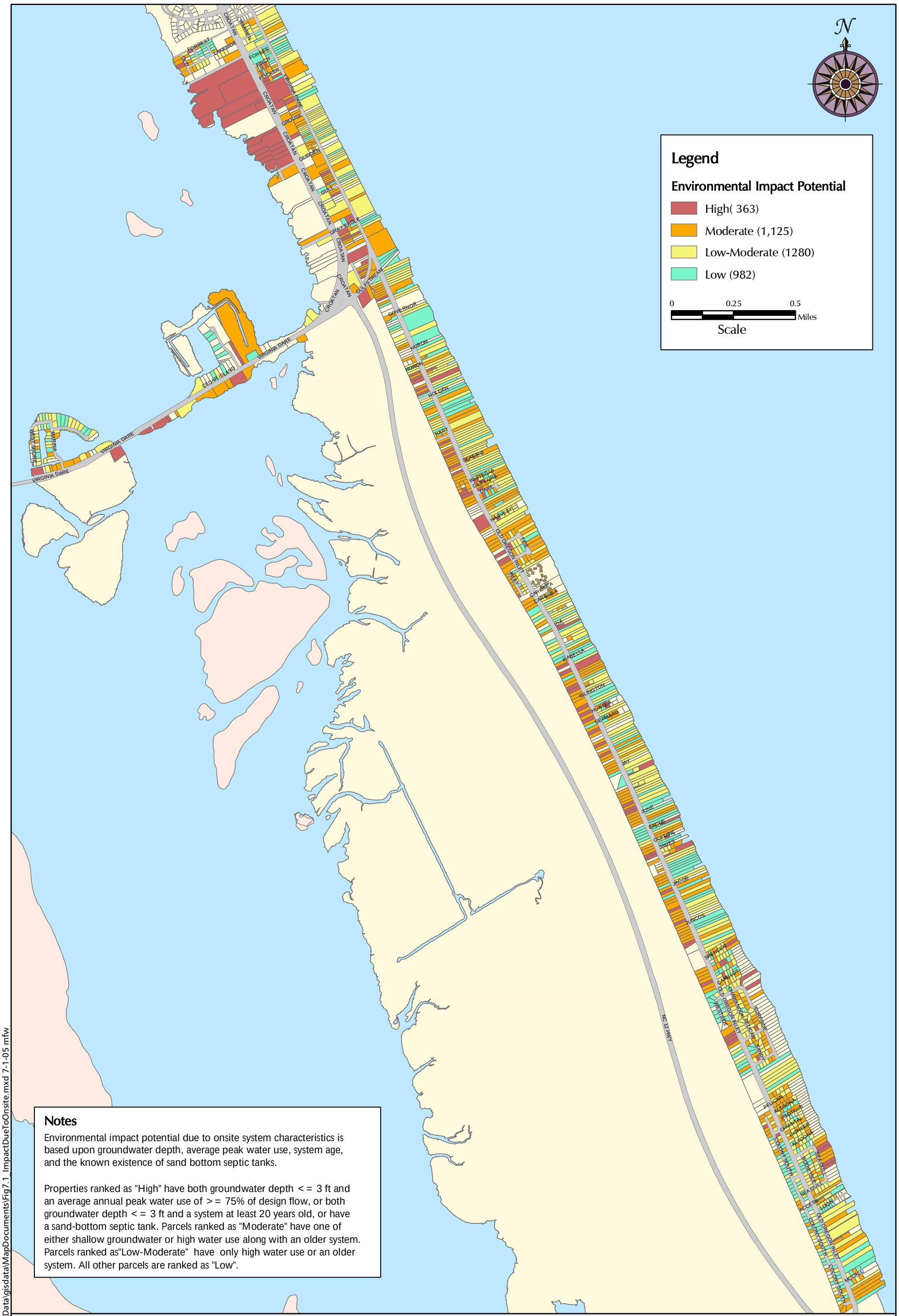


FIGURE 7.1b: ENVIRONMENTAL IMPACT POTENTIAL: ONSITE SYSTEM CHARACTERISTICS

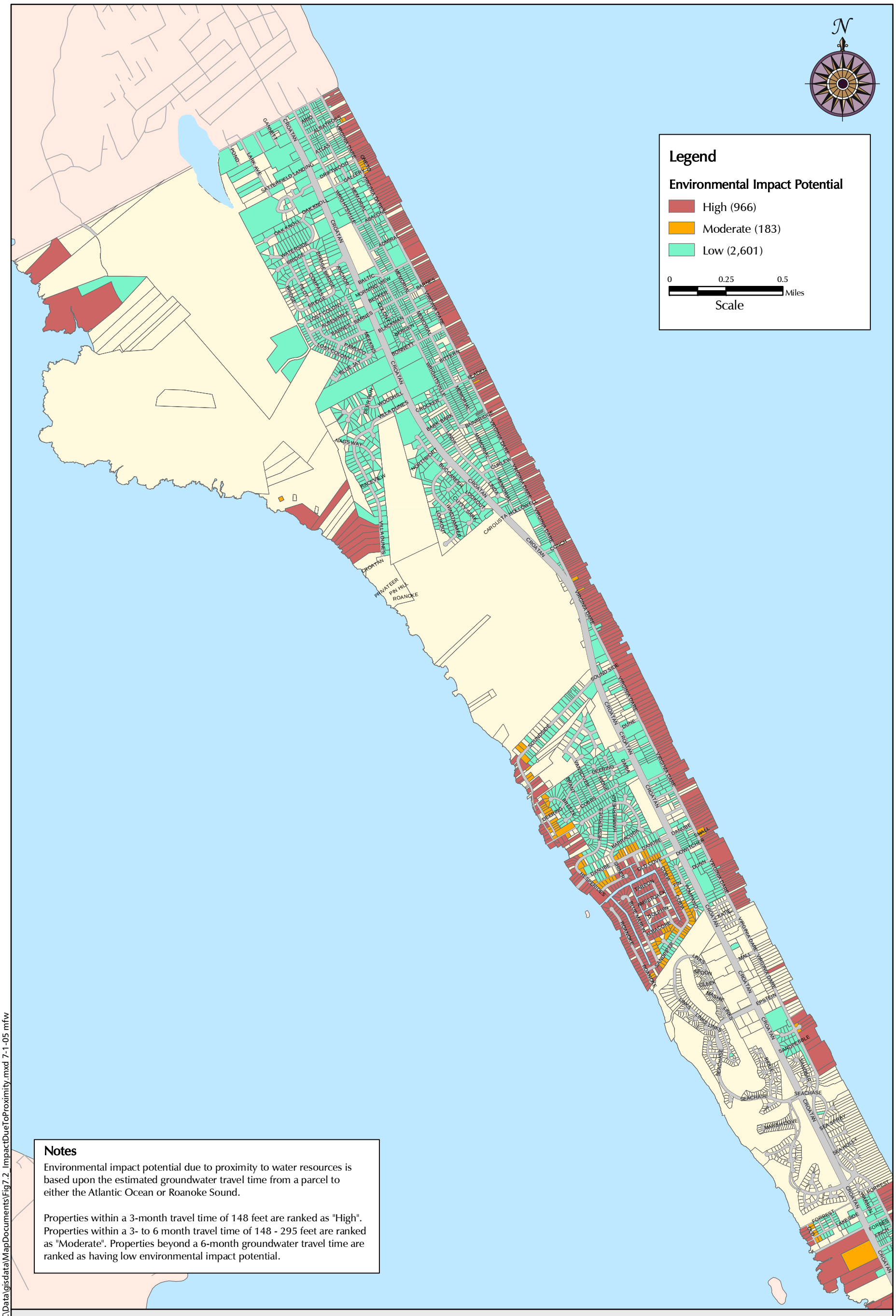
South Nags Head

Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Potential Environmental Impact Due to Onsite System Characteristics, SEI, June, 2005.

O:\proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig7.1_ImpactDueToOnsite.mxd 7-1-05 mfw



Notes

Environmental impact potential due to proximity to water resources is based upon the estimated groundwater travel time from a parcel to either the Atlantic Ocean or Roanoke Sound.

Properties within a 3-month travel time of 148 feet are ranked as "High". Properties within a 3- to 6 month travel time of 148 - 295 feet are ranked as "Moderate". Properties beyond a 6-month groundwater travel time are ranked as having low environmental impact potential.

FIGURE 7.2a: ENVIRONMENTAL IMPACT POTENTIAL: WATER RESOURCES PROXIMITY

North Nags Head

Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Potential Environmental Impact Due to Water Resources Proximity, SEI, June, 2005.

O:\proj-04\1477-W-NagsHeadNC\Data\gisdata\MapDocuments\Fig7.2_ImpactDueToProximity.mxd 7-1-05 mfw

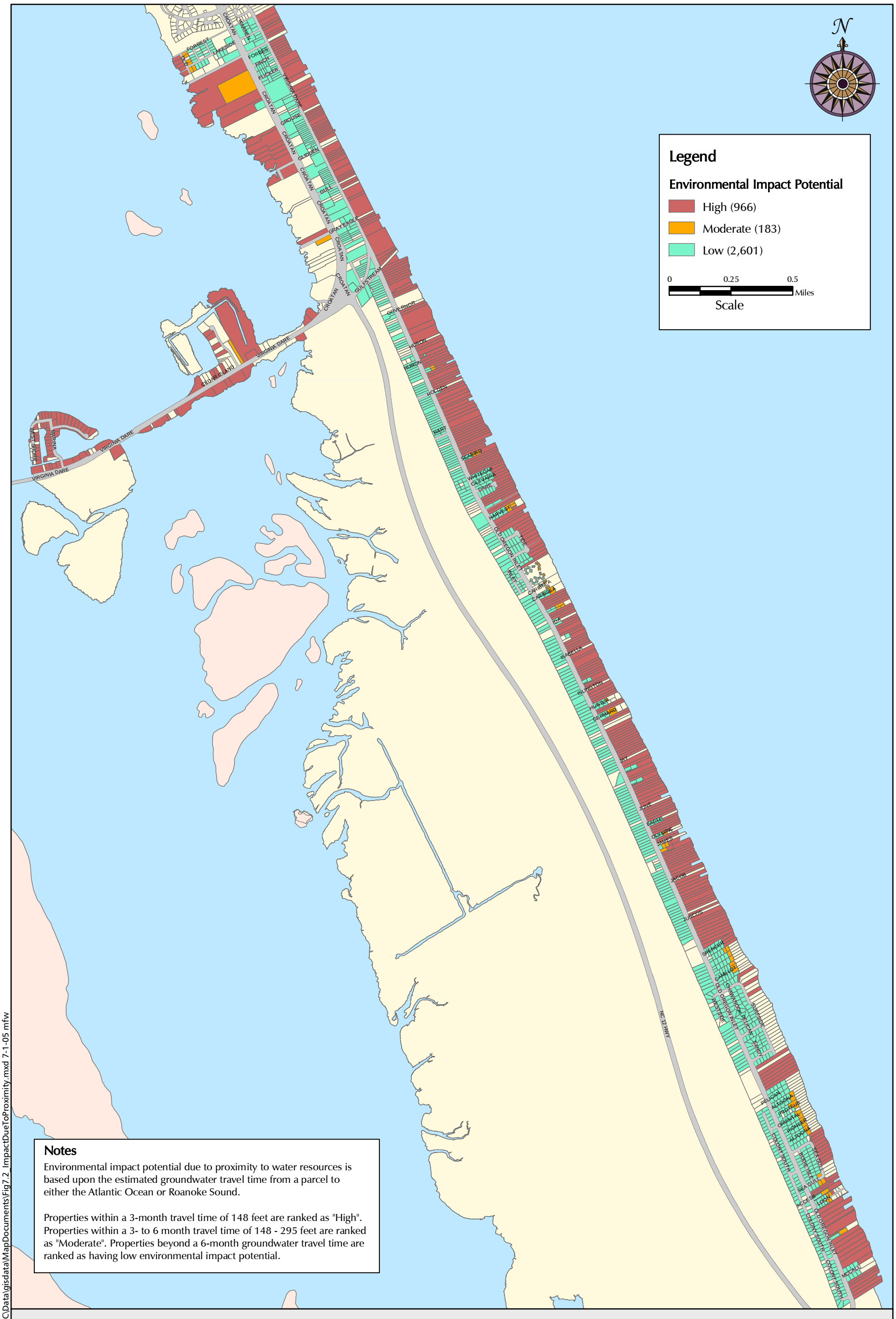


FIGURE 7.2b: ENVIRONMENTAL IMPACT POTENTIAL: WATER RESOURCES PROXIMITY

South Nags Head

Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Potential Environmental Impact Due to Water Resources Proximity, SEI, June, 2005.

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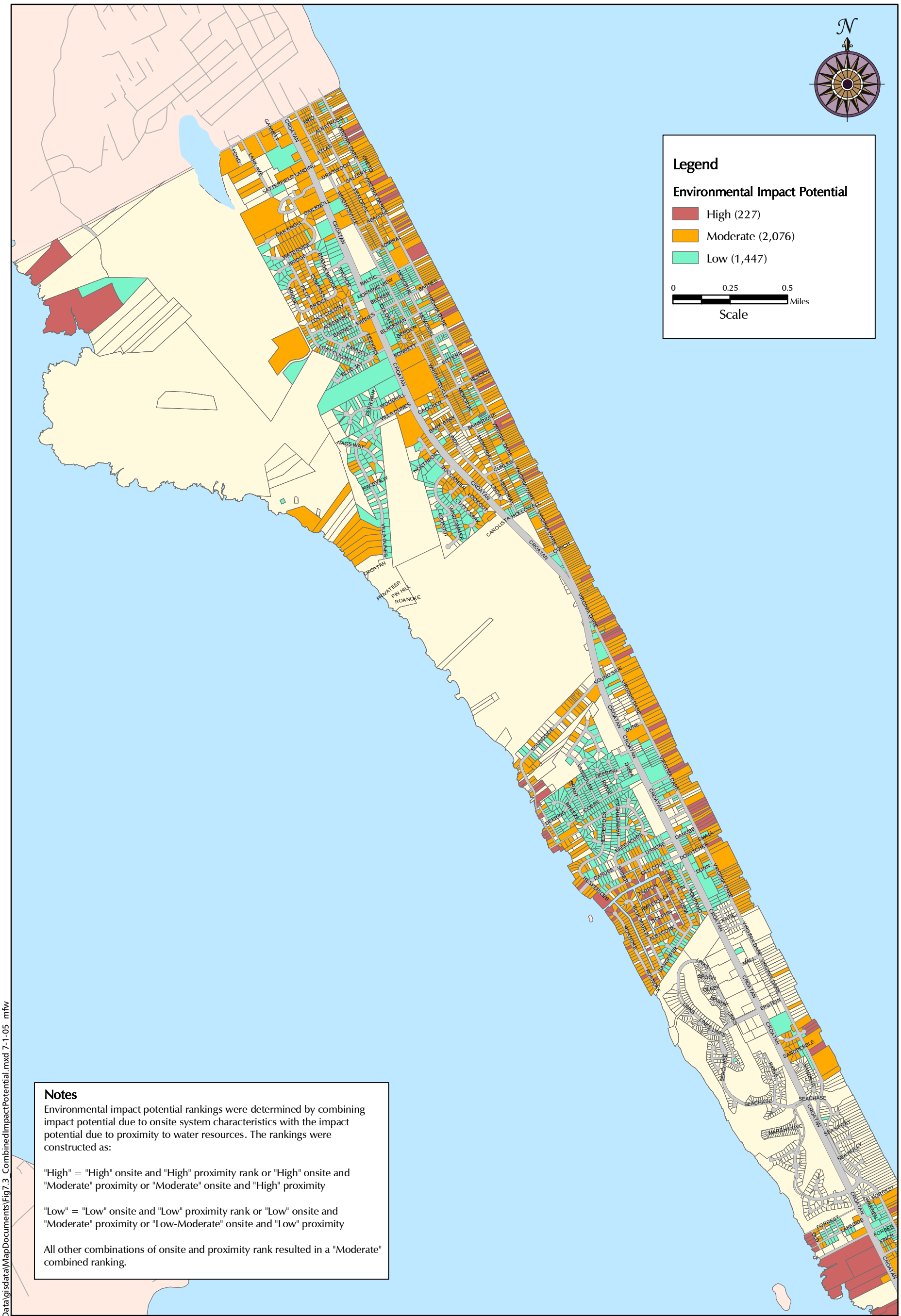

Notes

Environmental impact potential rankings were determined by combining impact potential due to onsite system characteristics with the impact potential due to proximity to water resources. The rankings were constructed as:

"High" = "High" onsite and "High" proximity rank or "High" onsite and "Moderate" proximity or "Moderate" onsite and "High" proximity

"Low" = "Low" onsite and "Low" proximity rank or "Low" onsite and "Moderate" proximity or "Low-Moderate" onsite and "Low" proximity

All other combinations of onsite and proximity rank resulted in a "Moderate" combined ranking.

FIGURE 7.3a: ENVIRONMENTAL IMPACT POTENTIAL: COMBINED RANKING

North Nags Head

Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Environmental Impact Potential, SEI, June, 2005.

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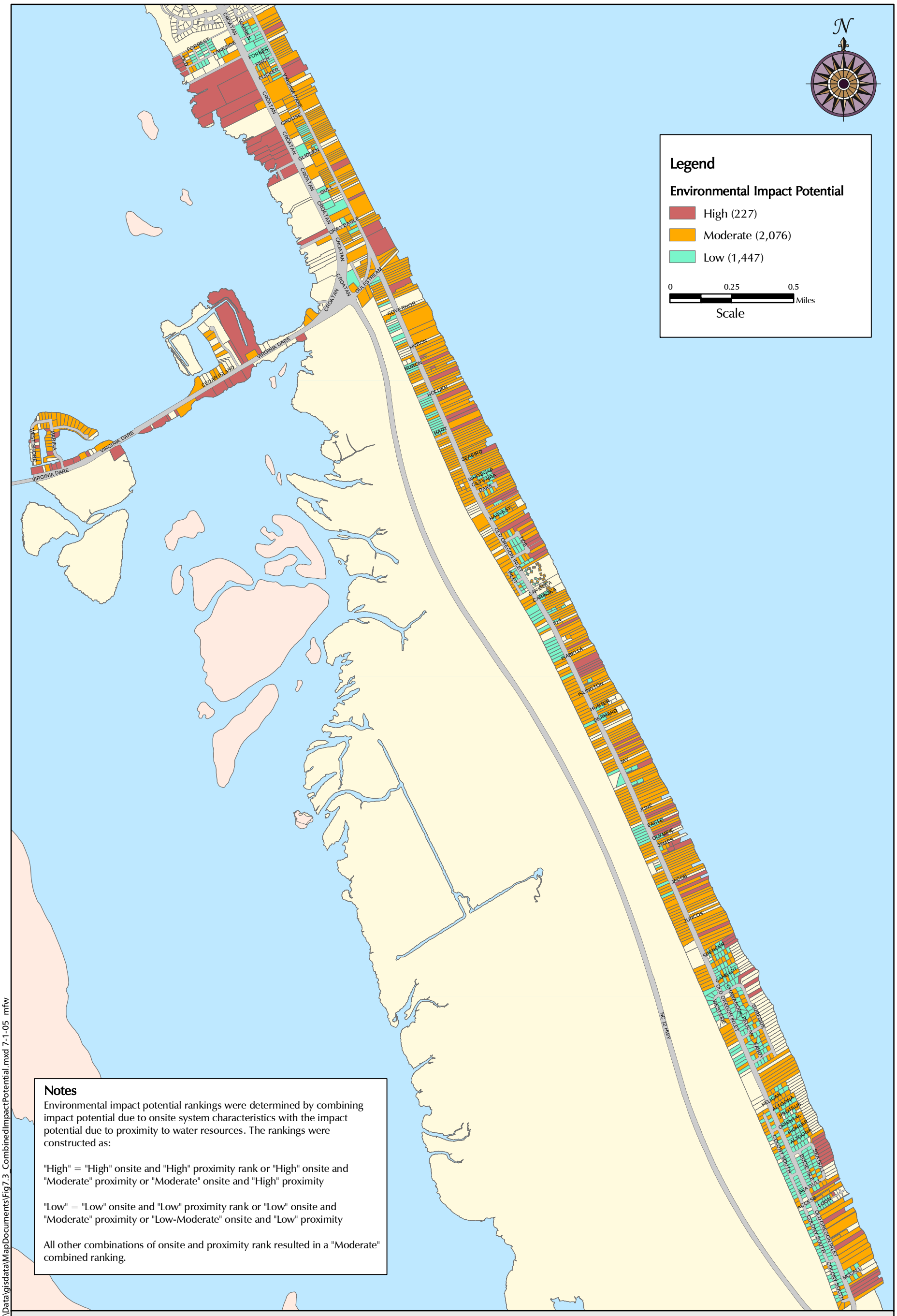

Notes

Environmental impact potential rankings were determined by combining impact potential due to onsite system characteristics with the impact potential due to proximity to water resources. The rankings were constructed as:

"High" = "High" onsite and "High" proximity rank or "High" onsite and "Moderate" proximity or "Moderate" onsite and "High" proximity

"Low" = "Low" onsite and "Low" proximity rank or "Low" onsite and "Moderate" proximity or "Low-Moderate" onsite and "Low" proximity

All other combinations of onsite and proximity rank resulted in a "Moderate" combined ranking.

FIGURE 7.3b: ENVIRONMENTAL IMPACT POTENTIAL: COMBINED RANKING

South Nags Head

Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Environmental Impact Potential, SEI, June, 2005.

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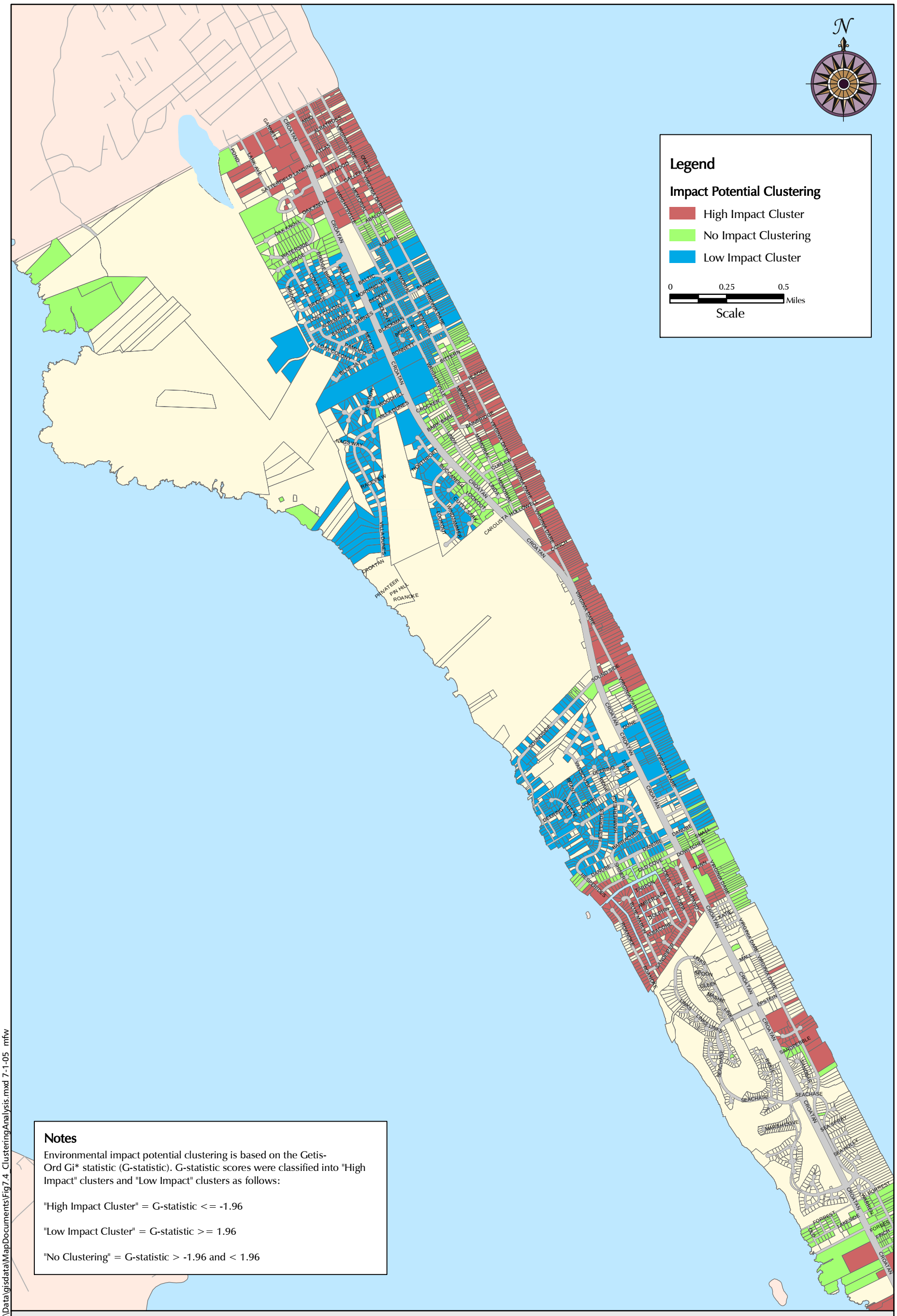

FIGURE 7.4a: ENVIRONMENTAL IMPACT POTENTIAL CLUSTERING ANALYSIS
North Nags Head
Nags Head Wastewater Management Program

Location Map

Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Environmental Impact Potential Clustering, SEI, June, 2005.

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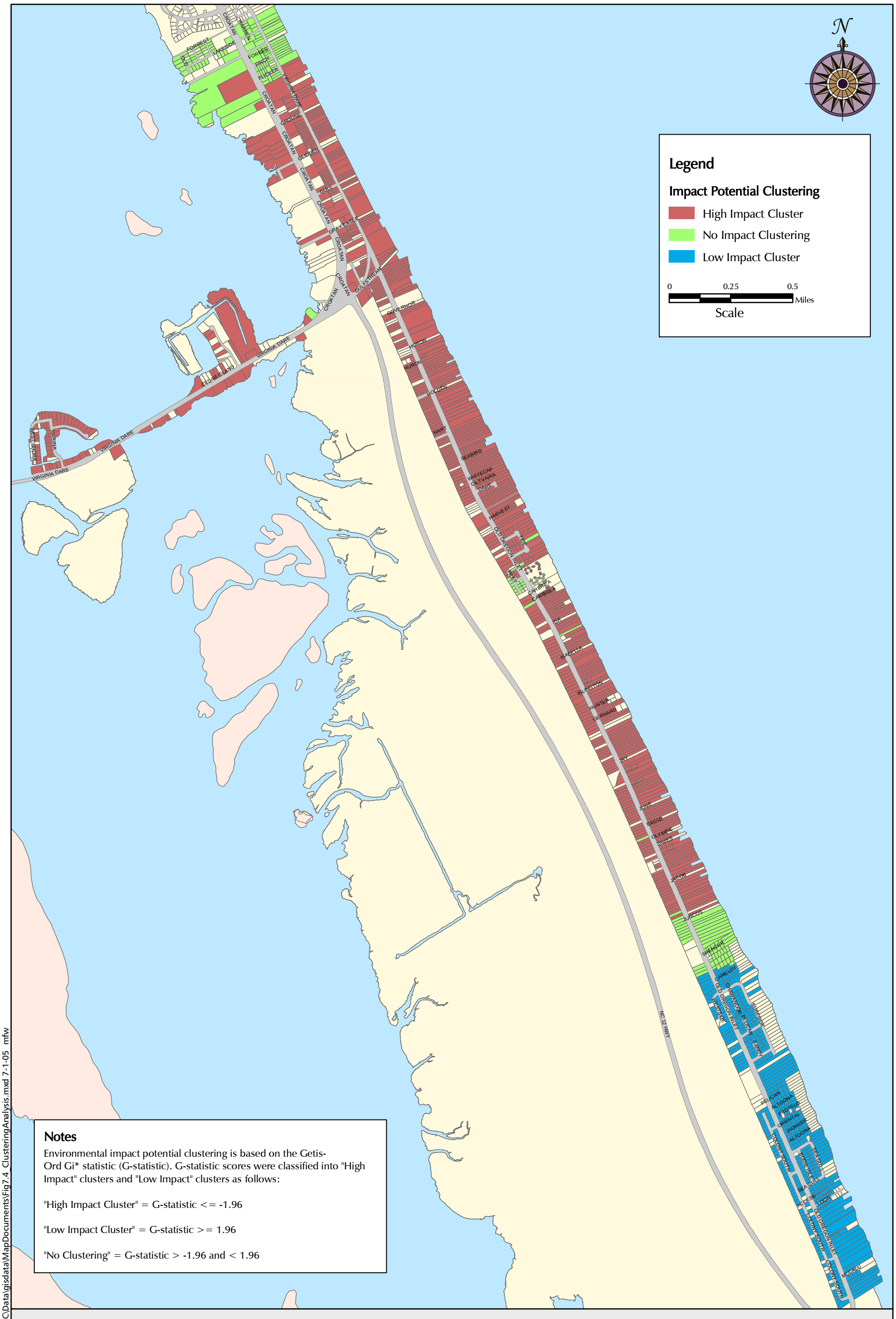
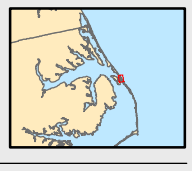


FIGURE 7.4b: ENVIRONMENTAL IMPACT POTENTIAL CLUSTERING ANALYSIS

South Nags Head

Nags Head Wastewater Management Program

Location Map



Source: Parcels from Town of Nags Head Planning Department, March, 2004;
Environmental Impact Potential Clustering, SEI, June, 2005.

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