

Working with the Budget: Planning and Budgeting for Pond Dredging on Kiawah Island

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Dredging

What is dredging?

Merriam-Webster says:

dredge - *verb* \ 'drej\

- a* : to dig, gather, or pull out with or as if with a dredge - often used with *up*
- b* : to deepen (as a waterway) with a dredging machine

Wikipedia says:

"**Dredging** is an excavation activity or operation usually carried out at least partly underwater, in shallow seas or fresh water areas with the purpose of gathering up bottom sediments and disposing of them at a different location."

Dredging

For stormwater ponds “dredging” seems to be a generic term for any kind of removal of material from the ponds?

So....

what are some of the removal methods for this material?

And...

what is the material you are removing and where does it come?

Sources

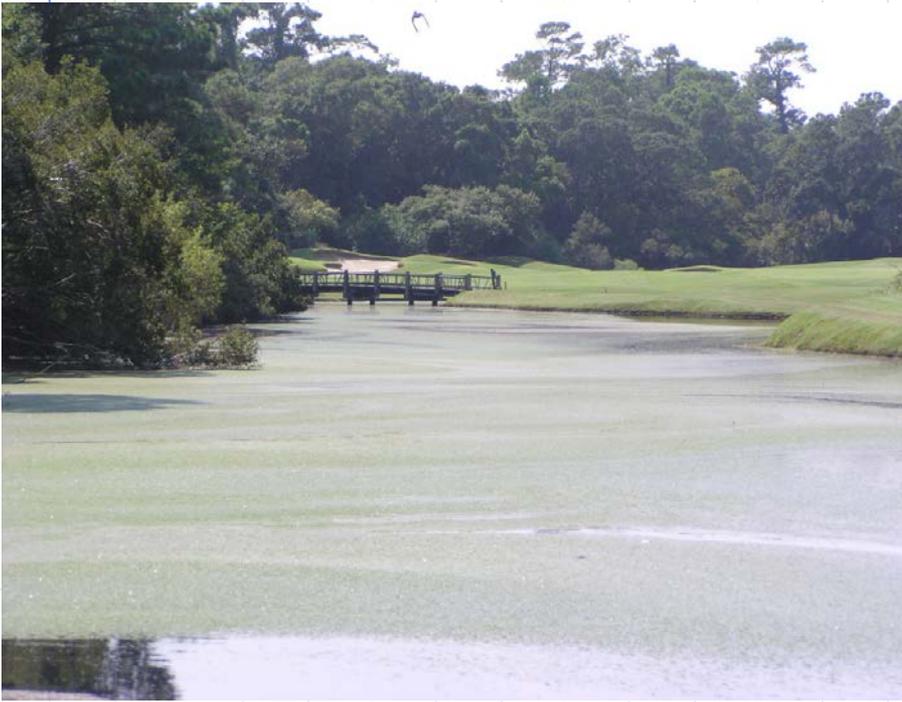


Plants, both aquatic....



Sources

....and terrestrial

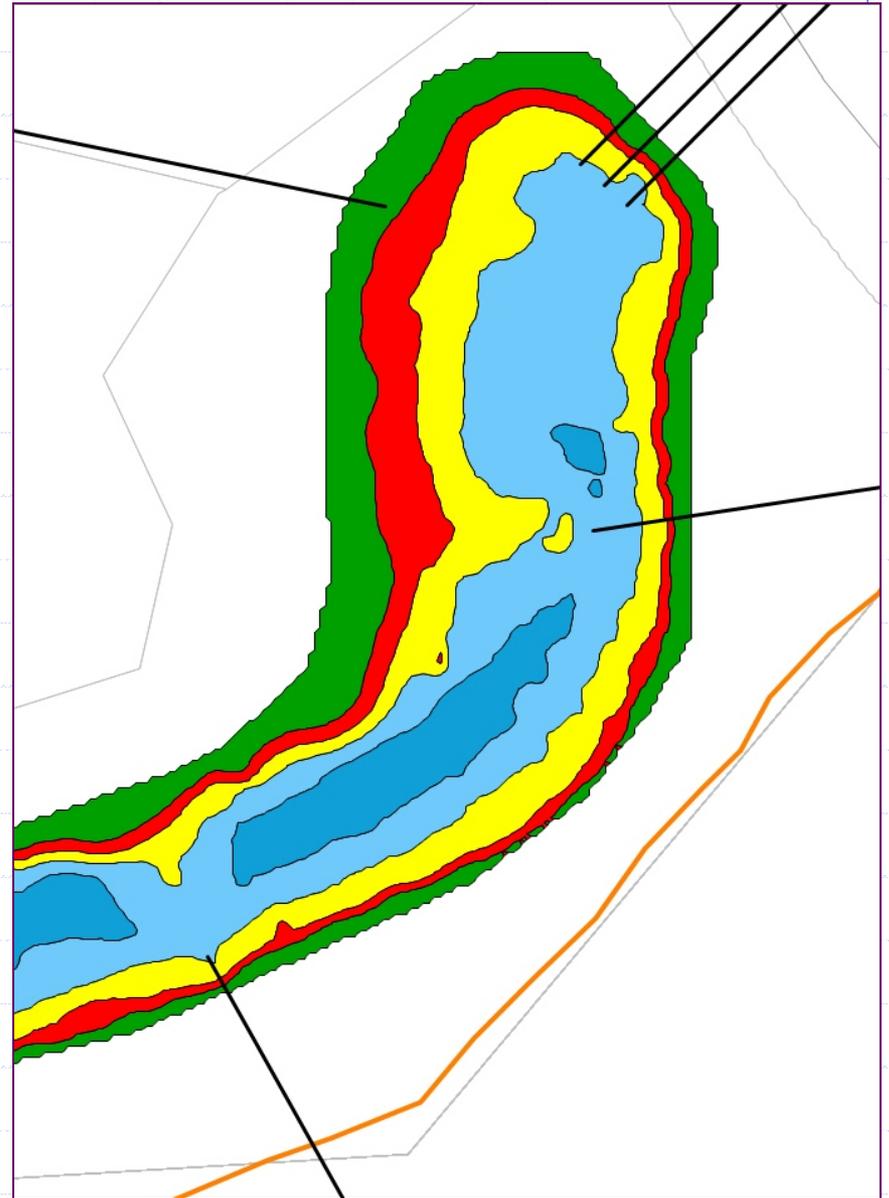


Sources



Sources

Traditional



Sources



Removal Considerations

- How big of an area and what is the volume of material?
- Can the pond be able to be isolated and dewatered?
- Can the pond's stormwater function be bypassed?
- How deep is the water where removal will occur?
- What is the accessibility to the pond?
- Is there a staging area available for removed?

Methods of Removal

- Draining and excavating - "in the dry"
- Excavation without draining - "in the wet"
- Floating dredges
- Submerged dredging

Draining and excavating



Draining and excavating

- Best suited if material needs to be removed from entire pond
- Low cost/volume removed if volume is large
- Depth of pond is generally not a limiting issue
- Accessibility is not an issue
- Staging of material is typically not an issue
- Requires that pond be able to be isolated and dewatered
- Requires that pond's stormwater function be able to be bypassed
- Work typically performed by excavators, dozers, pans and dump trucks

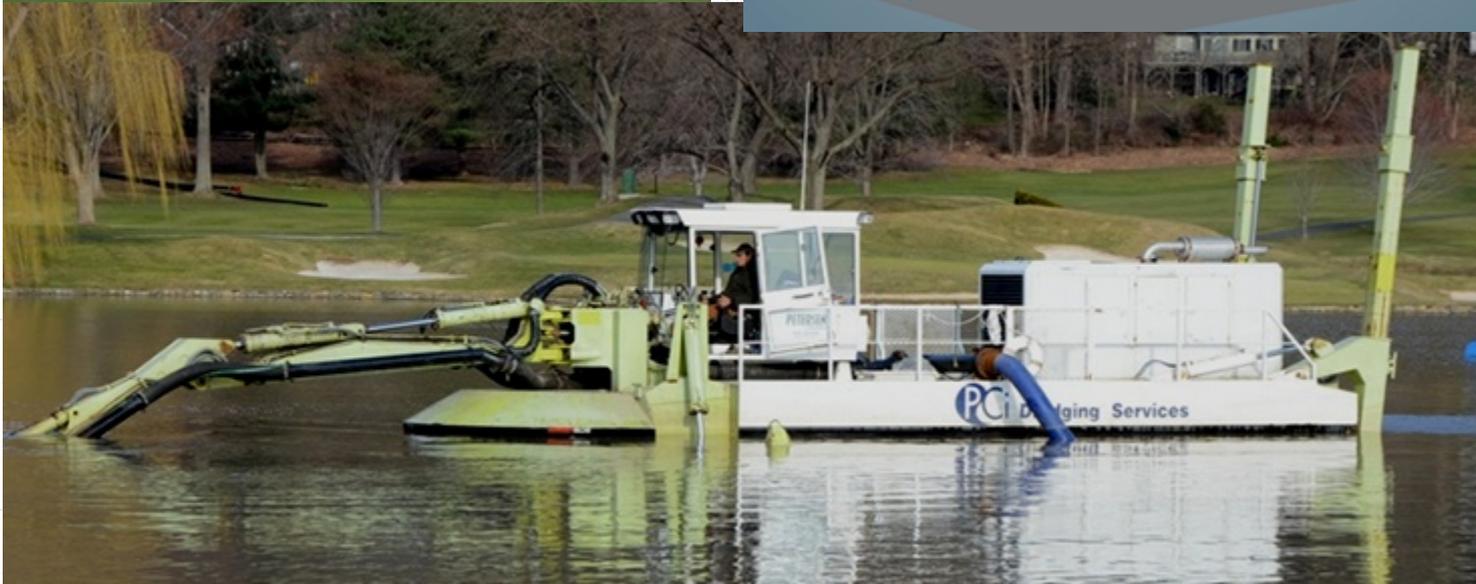
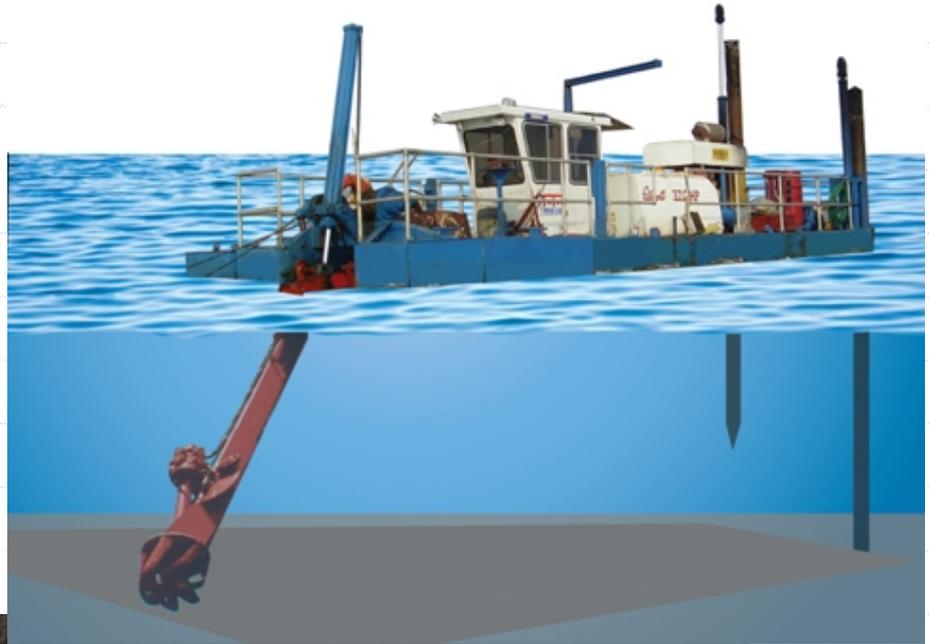
Excavation without draining



Excavation without draining

- Best suited for targeted material removal or if pond is relatively small
- Low cost/volume removed if volume is not large
- Depth of pond is a limiting issue
- Accessibility can be an issue
- Staging of material is typically not an issue
- Does not require that pond be able to be isolated and dewatered
- Does not requires that pond's stormwater function be bypassed
- Work typically performed by excavators and dump trucks

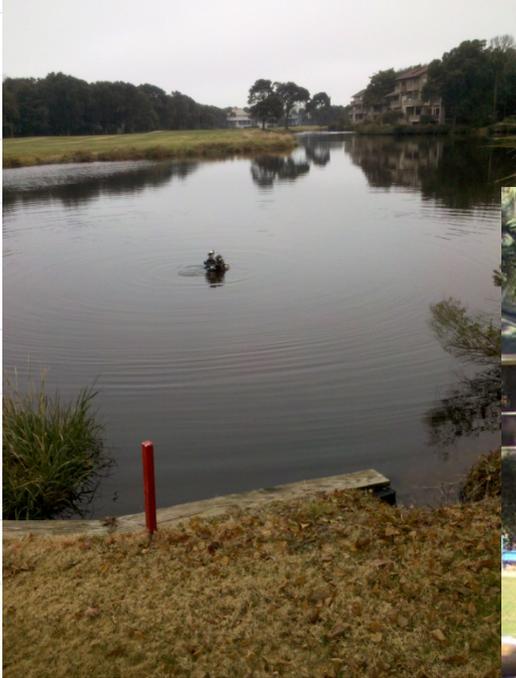
Floating dredges



Floating dredges

- Can perform small and large removal operations
- Moderate cost/volume removed irrespective of project size
- Depth of pond is not generally a limiting issue
- Accessibility is not an issue
- Staging of material can be an issue
- Does not require that pond be able to be isolated and dewatered
- Does not requires that pond's stormwater function be bypassed
- Work typically performed by portable floating dredge

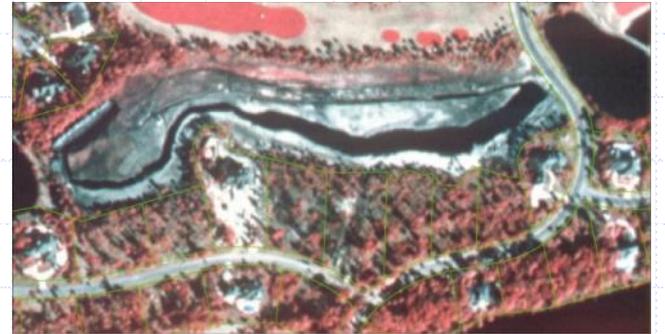
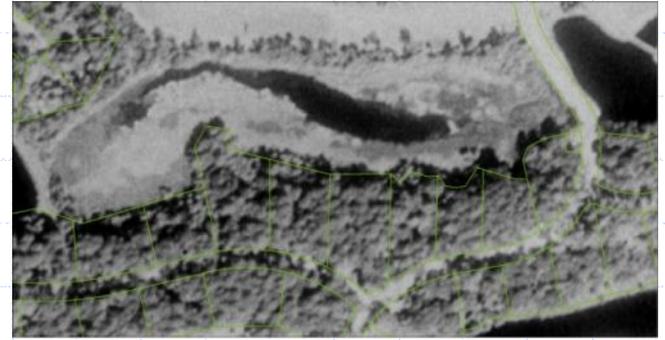
Submerged dredging



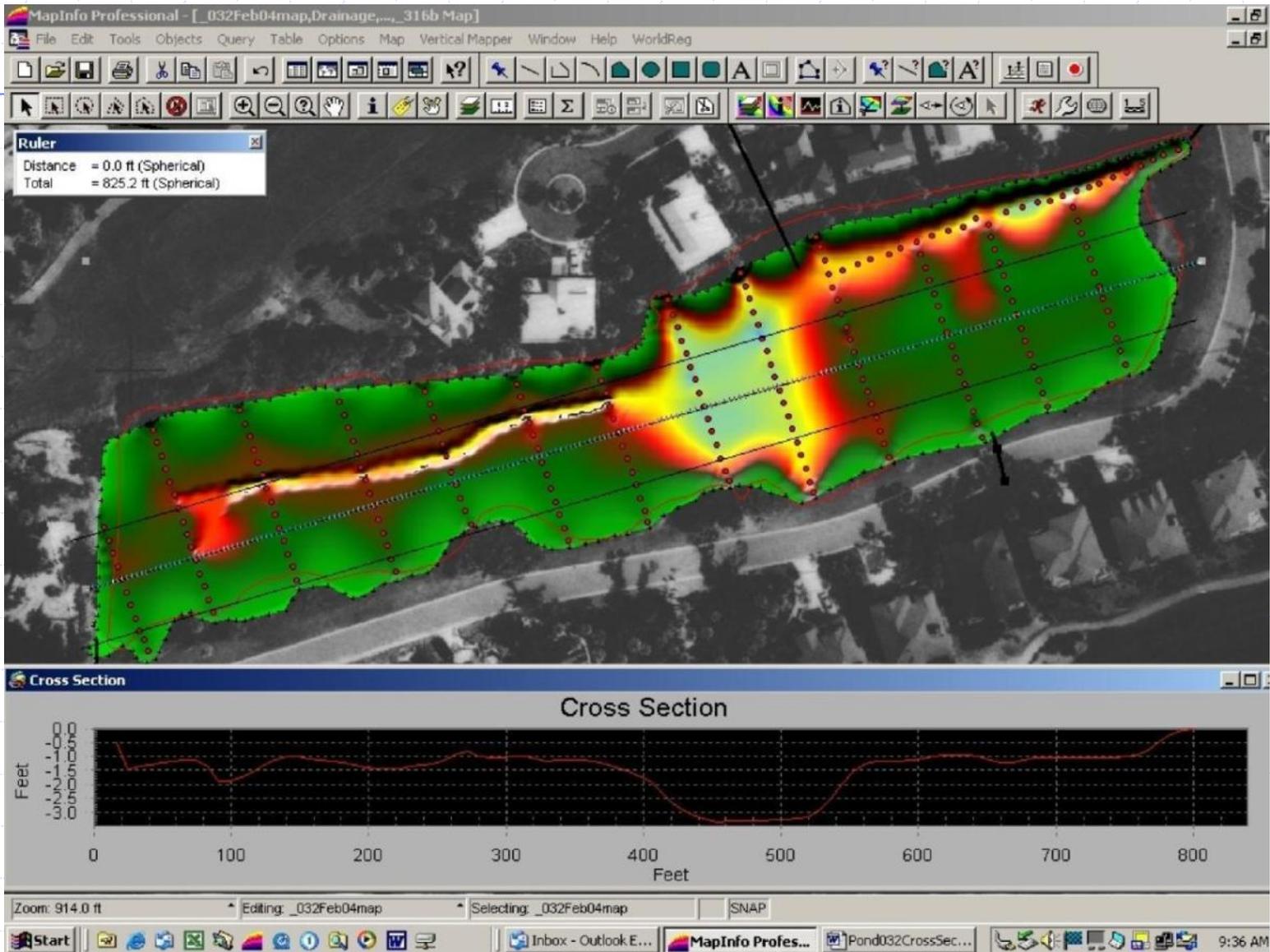
Submerged dredging

- Best suited for targeted material removal
- Moderate cost/volume if volume is not larger
- Depth of pond is not generally a limiting issue
- Accessibility is not an issue
- Staging of material can be an issue
- Does not require that pond be able to be isolated and dewatered
- Does not requires that pond's stormwater function be bypassed
- Work typically performed by diver-operated dredge

Project Examples



Pond 032 Excavation









2008-02-05

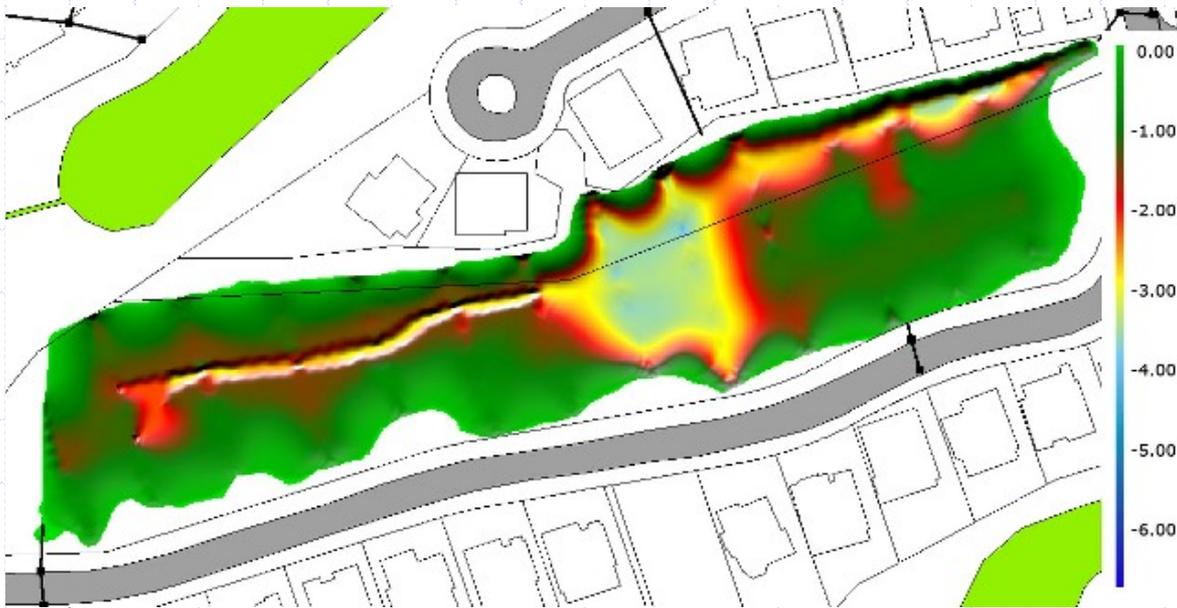




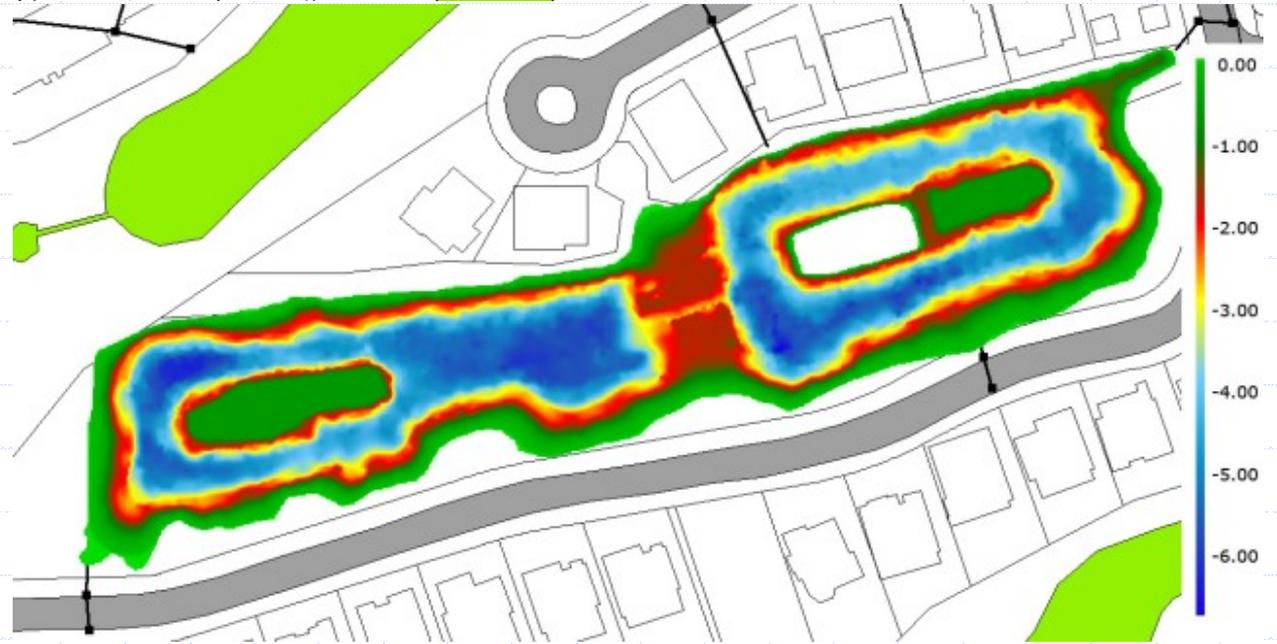
2008-03-06



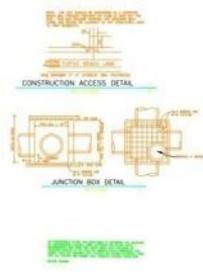
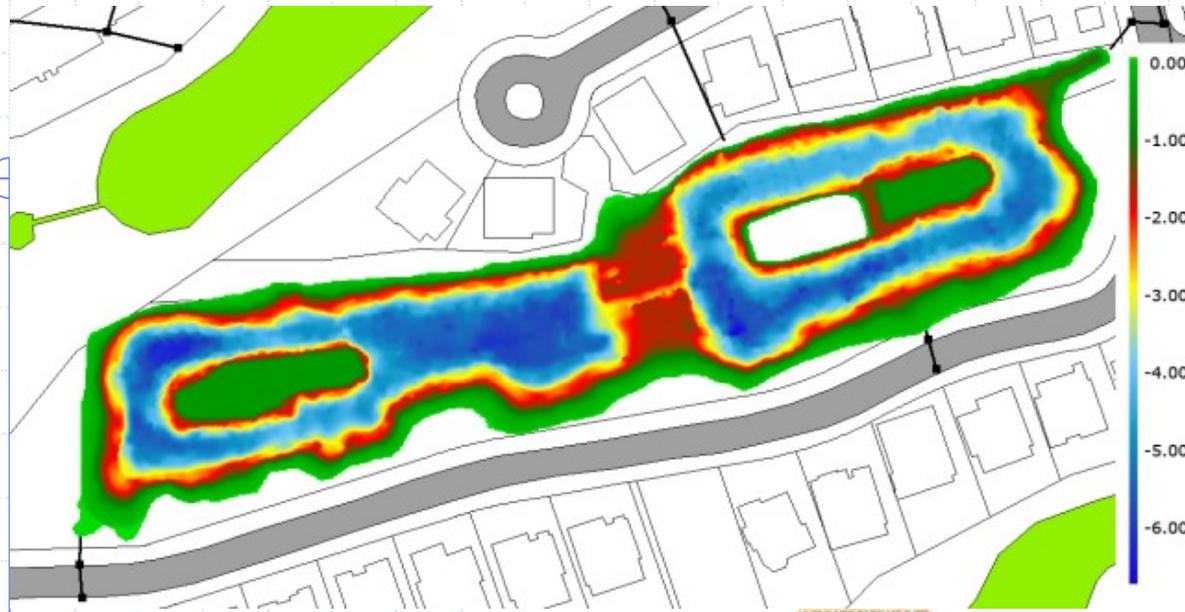
2008-03-06



2000



2008



GRAPHIC SCALE
 1" = 10' L

Pond 032 Stats

Lake Info

- 2000 volume – 150,369 cubic feet
- 2008 volume – 312,960 cubic feet
- 2000 maximum depth – 3.5 feet
- 2008 maximum depth – 7.0 feet
- 2000 average depth – 1.30 feet
- 2008 average depth – 2.86 feet

Retention Pond Services

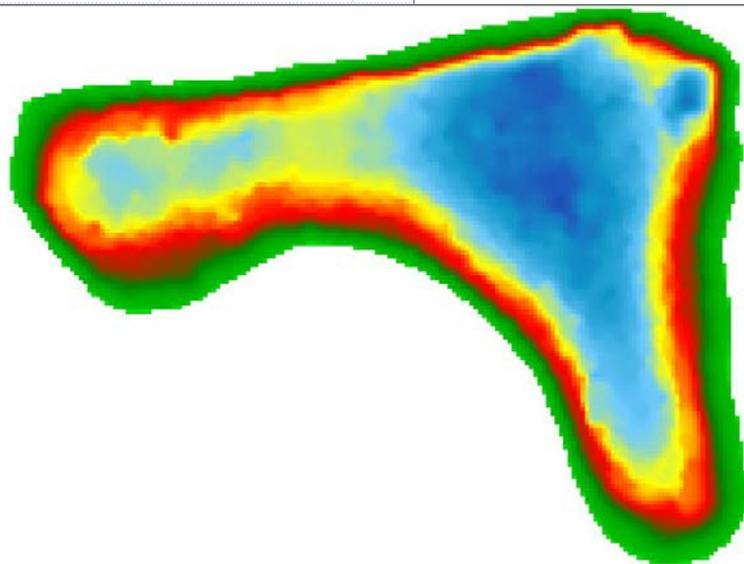
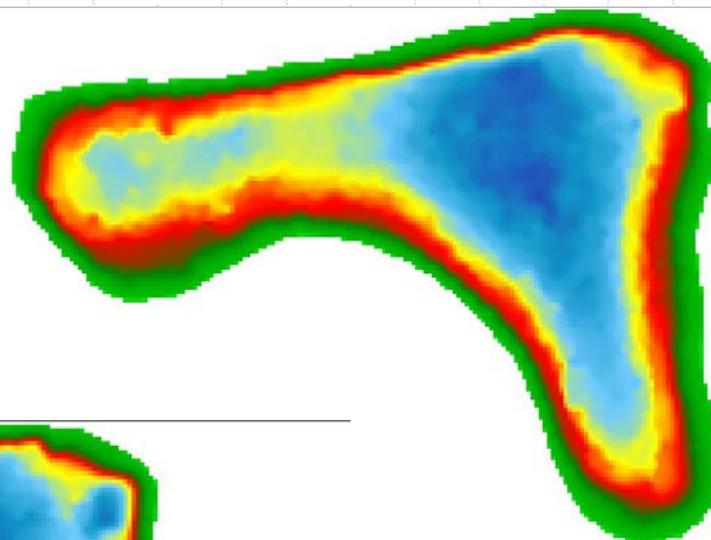
- 273,166 cubic feet or 10,117 cubic yards removed (based on extrapolated volume of 423,535 cubic feet)
- Estimated volume to be removed 10,000 cubic yards
- Contract price – \$272,000
- Completion price - \$272,000
- Contract work period – 51 days (Jan 17th – Mar 17th)
- Completion work period – 17 days (Jan 21st – Mar 1st with 1 week taken off)
- Cost/cubic foot – \$1.00

Pond 015 Diver Sediment Removal

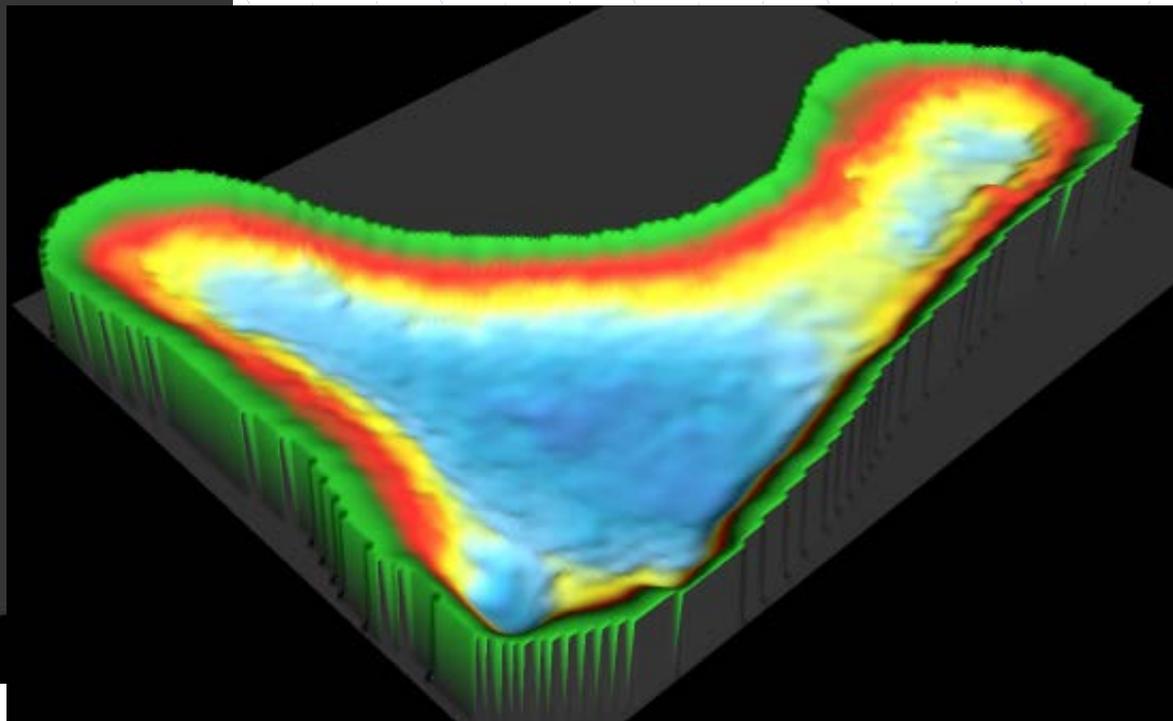
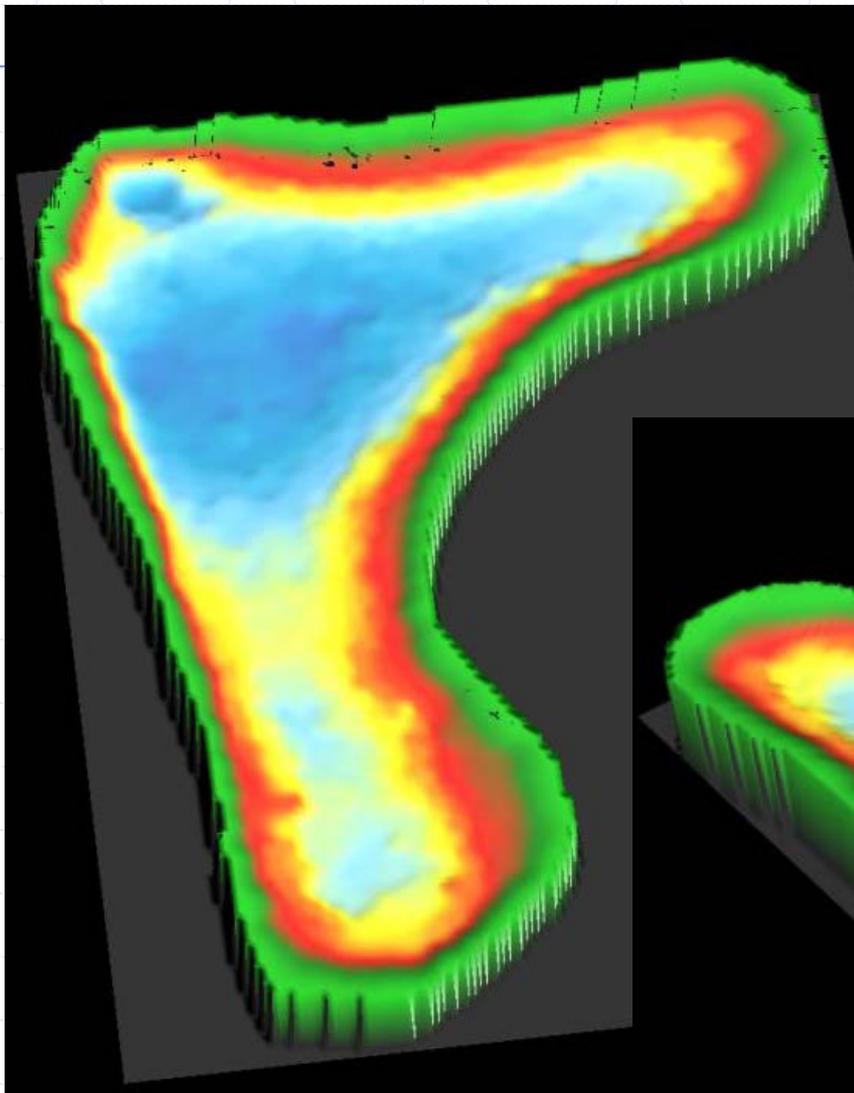




Pond 015 2007 Pre and Post Dredging



Pond 015 3-D



Pond 015 Stats

Lake Info

- 2007-02 volume – 32,020 cubic feet
- 2007-03 volume – 32,295 cubic feet

Eason Diving

- 270 cubic feet or 10 cubic yards removed
- Contract price – time and materials
- Completion price – \$3,525.50
- Contract work period – 2 days (Feb 19th - 20th)
- Completion work period – 2 days (Feb 19th - 20th)
- Cost/cubic foot – \$12.82

Costs

Pond Number	Date	Contractor	Method	Volume Removed (cubic feet)	Cost	Cost / Cubic Foot
015 / 020	2007-02-21	Eason Diving	Diver operated dredge / poly bags	554	\$7,100.00	\$12.82
016	2008-12-30	Eason Diving	Diver operated dredge / poly bags	361	\$10,413.55	\$28.83
023	2008-12-30	Eason Diving	Diver operated dredge / poly bags	281	\$8,094.24	\$28.83
024	2011-12-30	Eason Diving	Diver operated dredge / poly bags	1,918	\$24,000.00	\$12.51
077	1993-11-05	Otter Construction	Heavy equipment	1,242,000	\$130,000.00	\$0.10
054	1993-11-09	Otter Construction	Long-reach excavator	810	\$2,800.00	\$3.46
008	1999-12-09	Holland Environmental	Long-reach excavator	64,800	\$27,050.00	\$0.42
032	2008-03-01	Retention Pond Services	Long-reach excavator	273,159	\$272,000.00	\$1.00
085	2008-08-05	Retention Pond Services	Long-reach excavator	9,720	\$6,656.00	\$0.68
009	2008-08-07	Retention Pond Services	Long-reach excavator	2,430	\$2,656.00	\$1.09
014	2008-08-08	Retention Pond Services	Long-reach excavator	14,580	\$14,016.00	\$0.96
024	2002-09-26	Eadie's Drain & Vacuum	Vacuum truck	513	\$3,840.00	\$7.49
078	2002-09-26	Eadie's Drain & Vacuum	Vacuum truck	108	\$800.00	\$7.41
024	2007-60-30	Eadie's Drain & Vacuum	Vacuum truck / poly bags	1,485	\$35,292.50	\$23.77

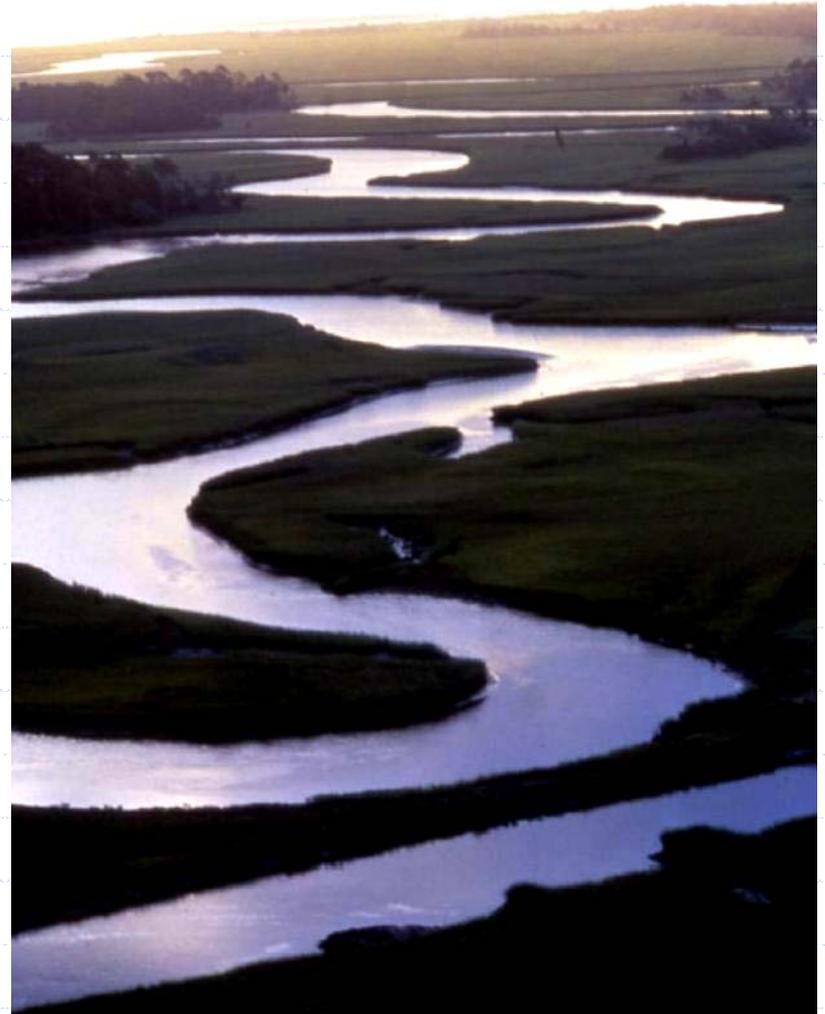


Norm Shea

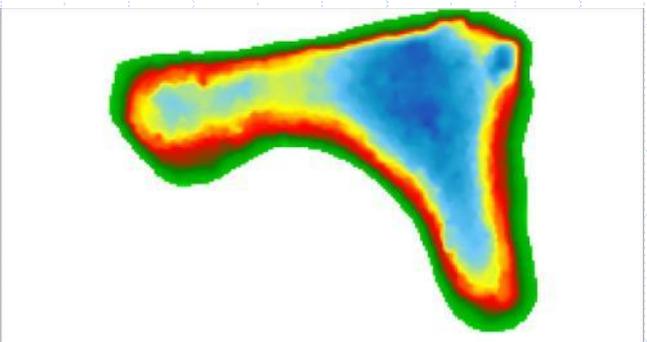
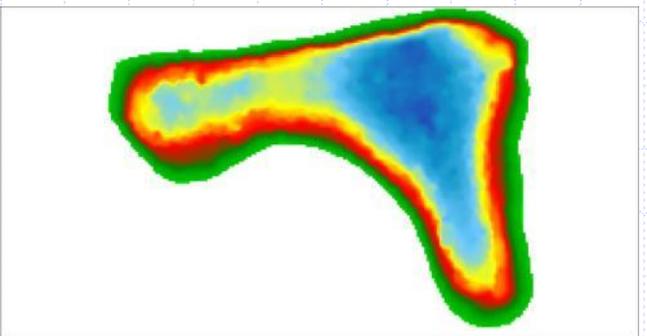
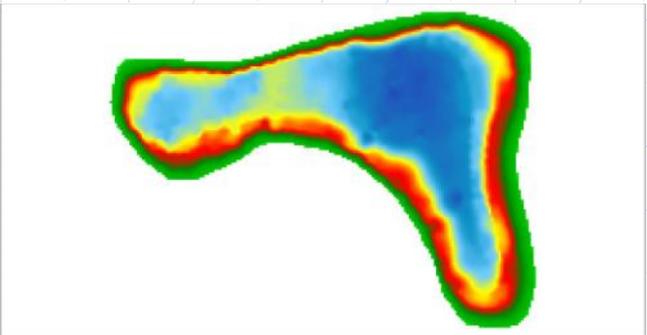
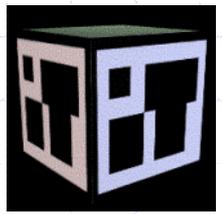
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Bottom mapping





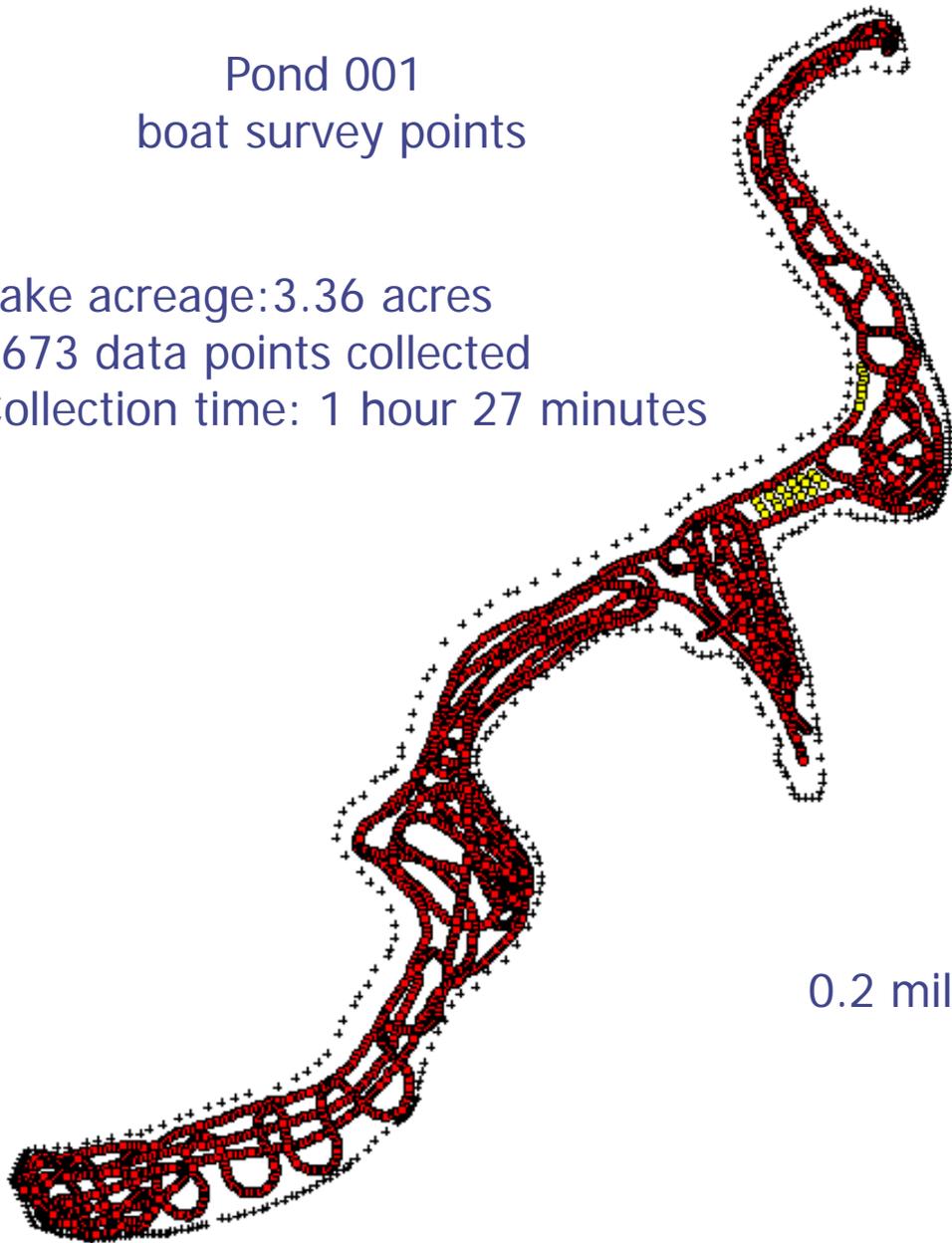
3. 19. 2001





Pond 001
boat survey points

Lake acreage: 3.36 acres
3673 data points collected
Collection time: 1 hour 27 minutes

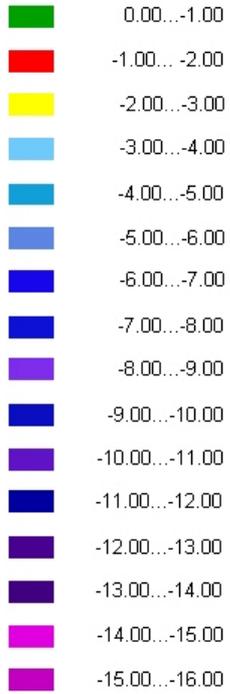


0.2 mile

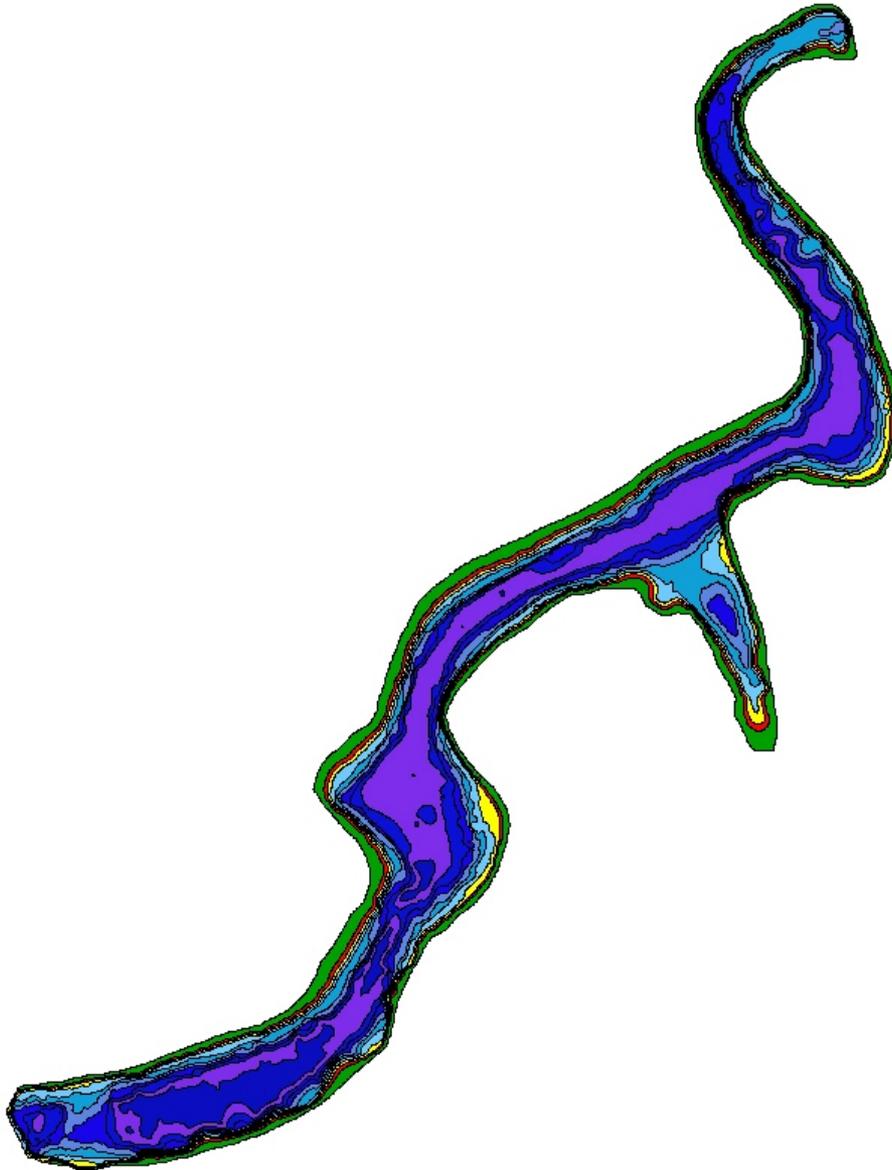
N



Contour Legend
(feet)

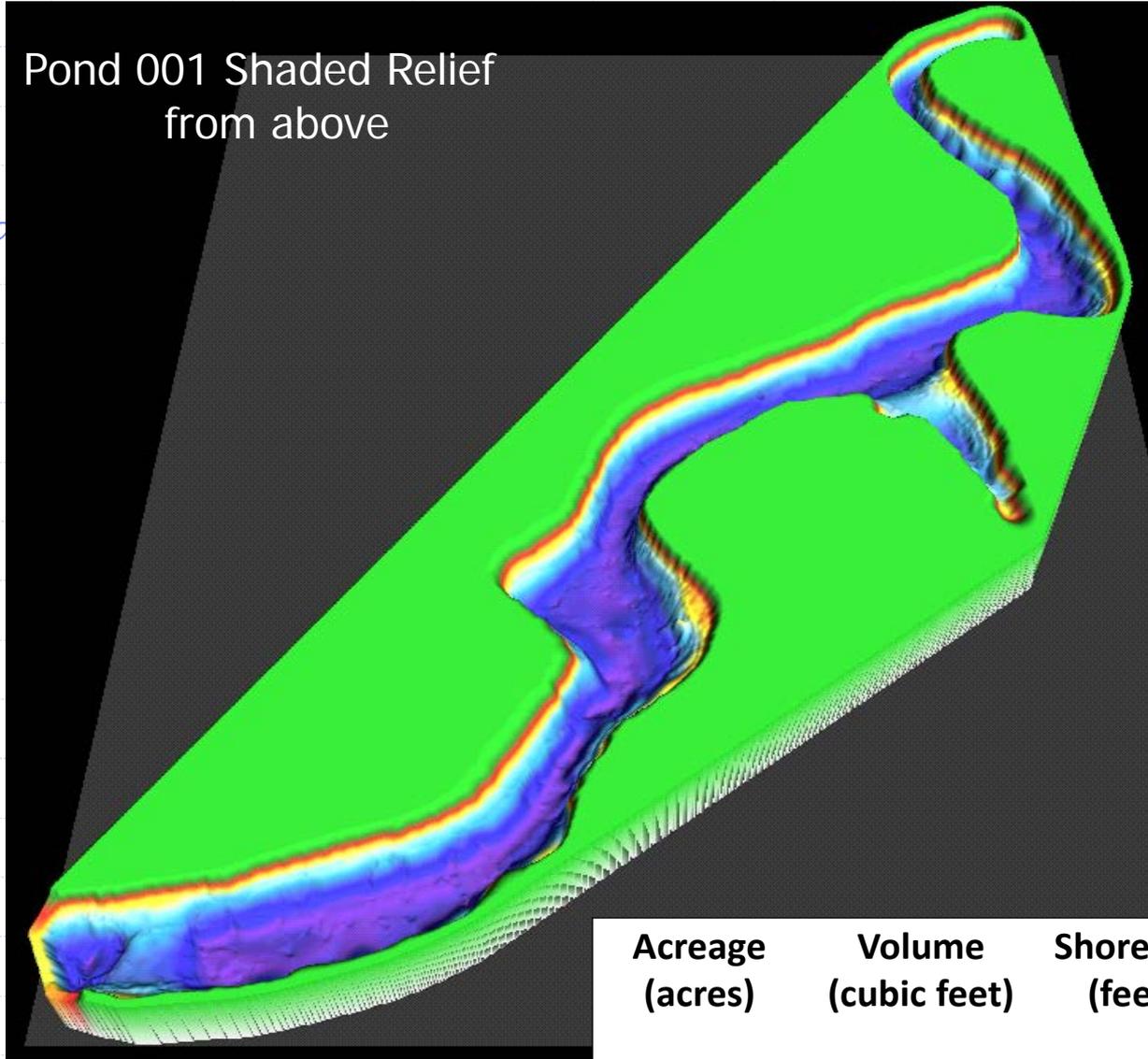


Scale
1"=170'



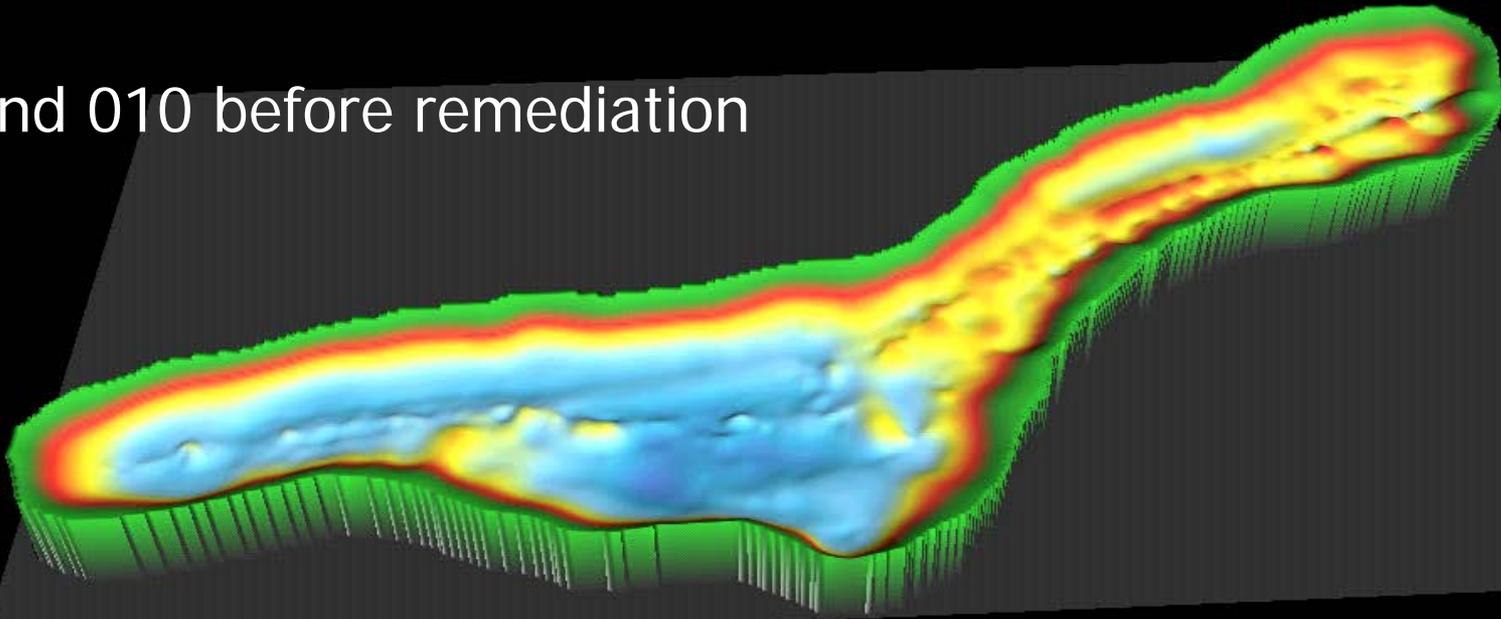
Pond 001

Pond 001 Shaded Relief
from above



Acreage (acres)	Volume (cubic feet)	Shoreline (feet)	Maximum Depth (feet)	Average Depth (feet)
3.36	740,270	2,171	10.00	5.06

Pond 010 before remediation



Pond 010 after remediation

