

Gunston Cove Study Overview

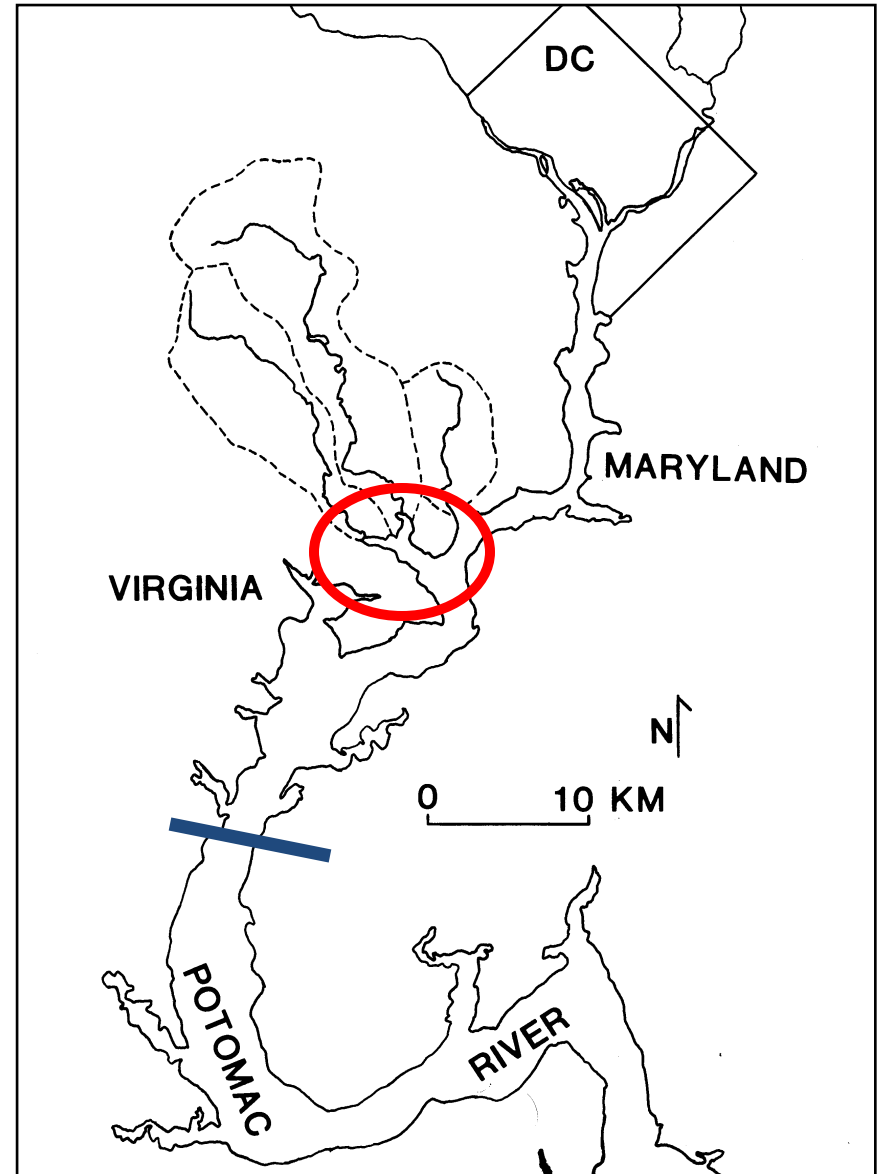


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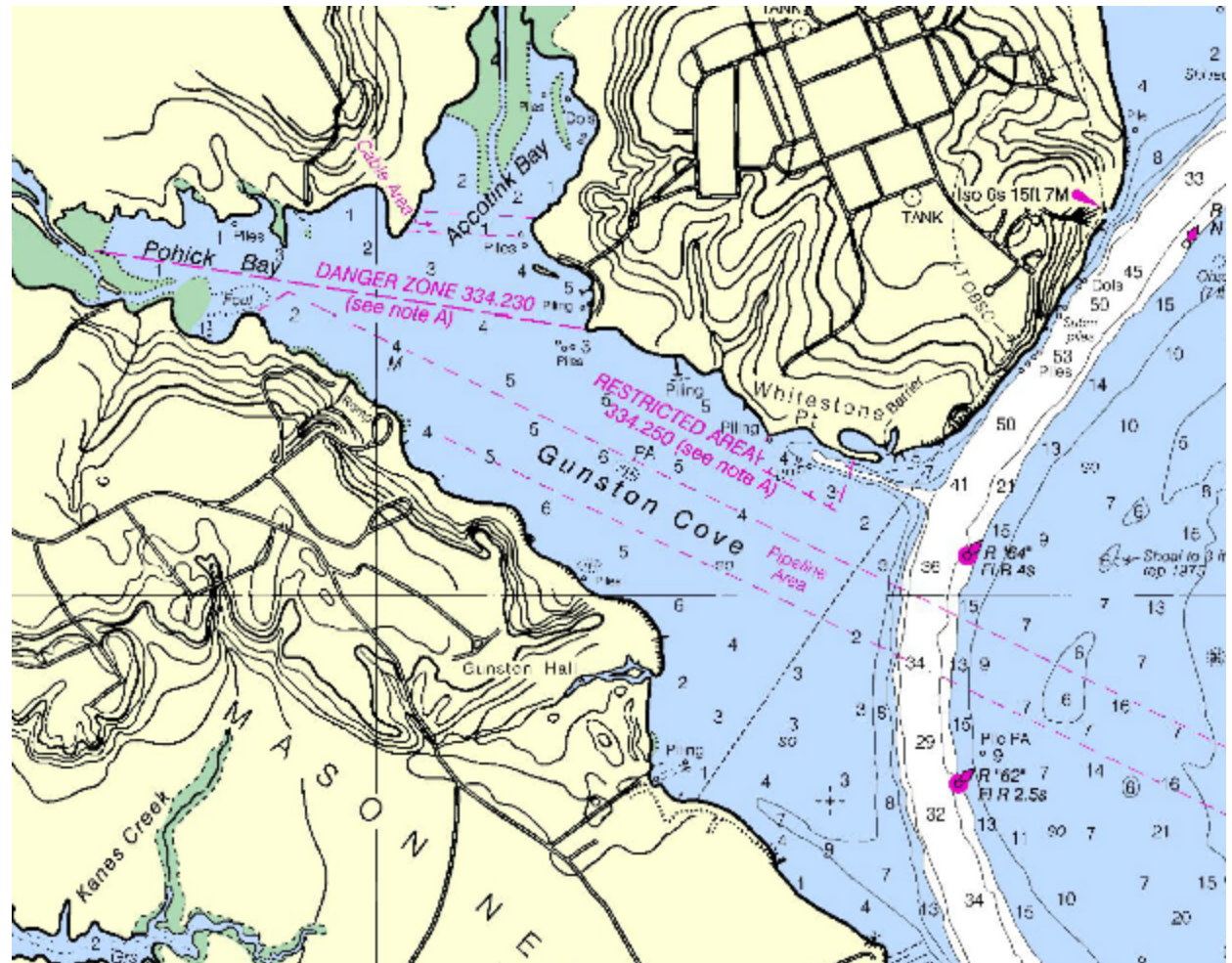
General Location

- Gunston Cove is a “y-shaped” embayment in Fairfax Co, VA
- Tidal freshwater portion of the Potomac River
- 20 km down-stream of DC line and Blue Plains
- 20 km upstream of Quantico (approx. limit of tidal fresh)



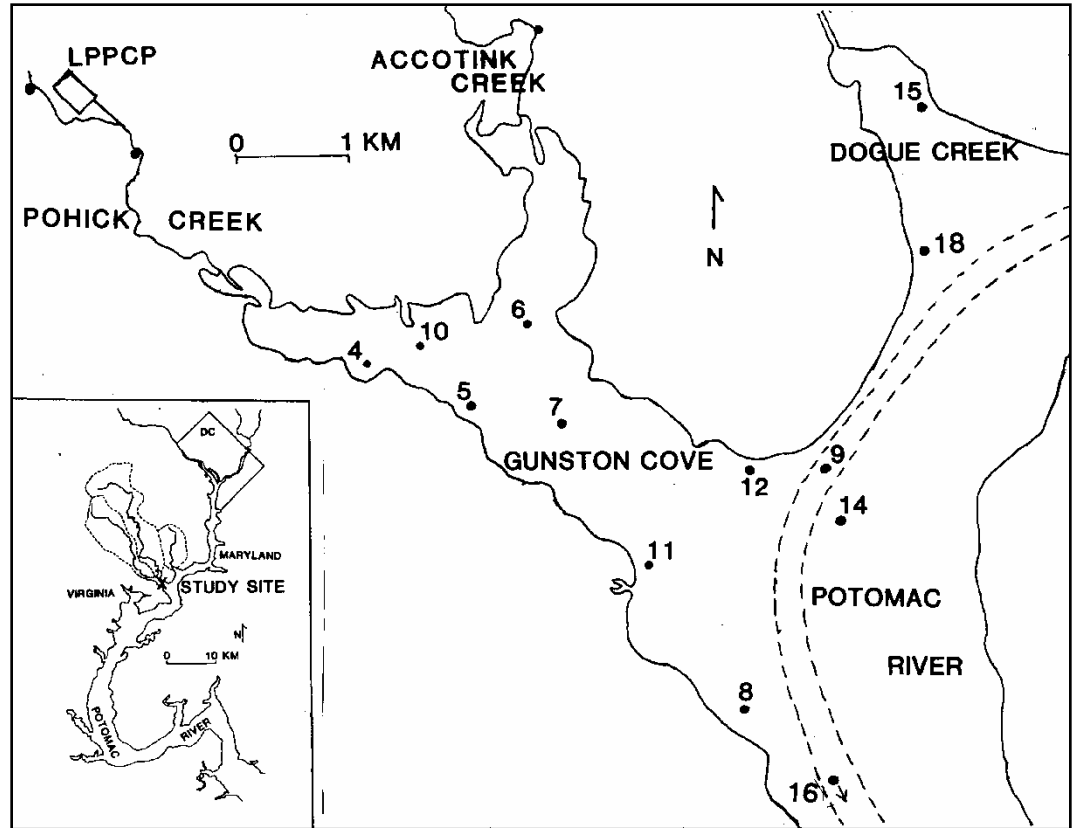
Gunston Cove

- Gunston Cove has a fairly uniform depth of 1.5-2 m at mean low tide
- Tidal current velocities are strong in the river channel, but much weaker in the cove



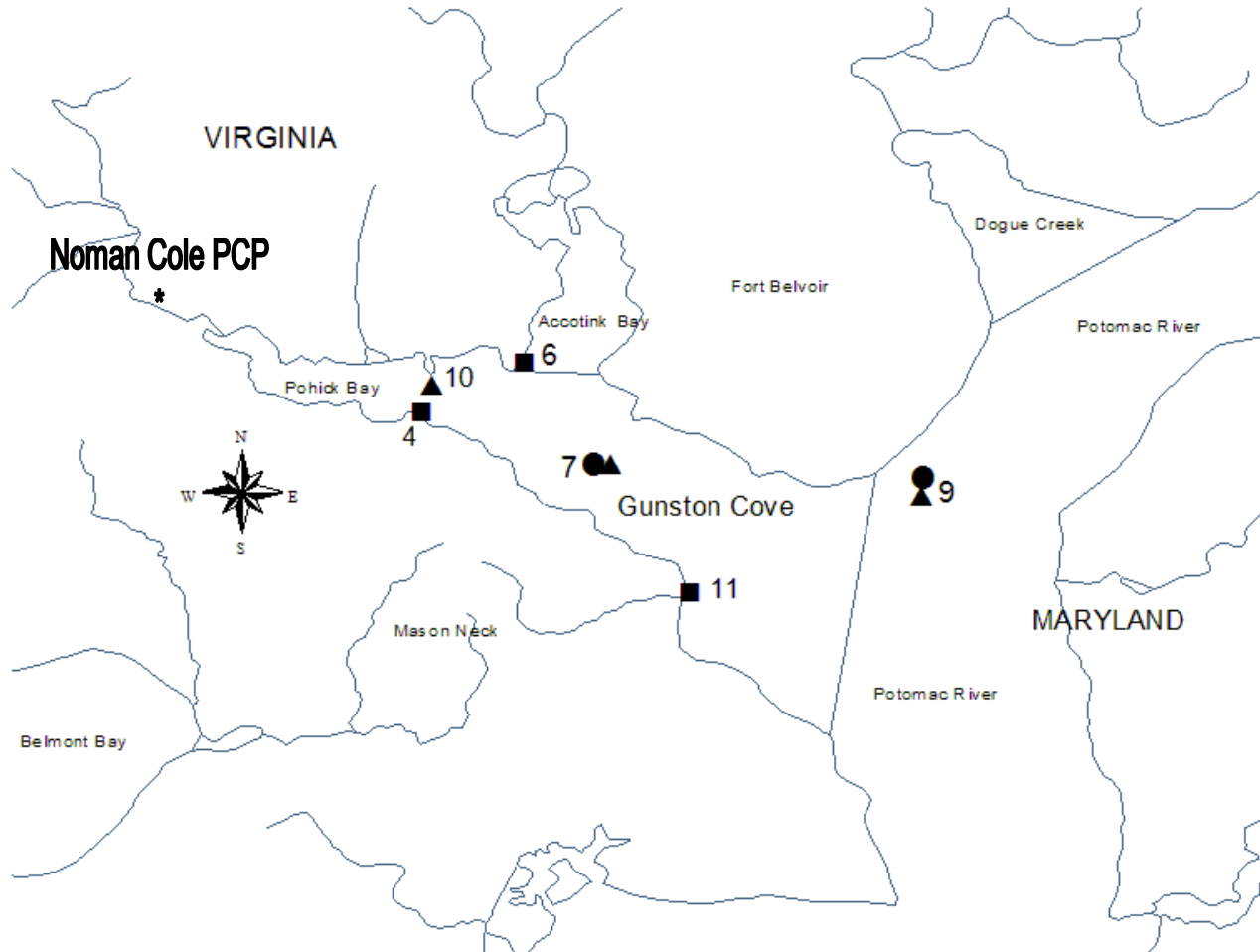
Gunston Cove Study

- The study originated in 1983/84 at the request of Fairfax County
- The County has a major wastewater treatment plant on Pohick Cr just above head of tide (LPPCP on this map)
- From 1984 - 1990, there was a network of 11-14 sampling stations
- During the 1990's the number of WQ stations was gradually reduced so that by 2000, there were only two: Station 7 (indicative of the cove) and Station 9 (indicative of the river)



We demonstrated that these two sites were adequate to describe water quality trends in the following journal article: Jones et al. 2008.

Gunston Cove Study



Here is the current sampling network. All of these sites have been in operation since 1984

Water quality data is also available for 1983.

Monitoring Site Key:

- water quality and plankton
- ▲ fish trawl
- fish seine



Water Quality Variables

- Water Quality Profiles
 - Temperature
 - Conductivity
 - Dissolved oxygen
 - pH
- Water Quality: surface and bottom samples
 - N: NO_3^- , NH_4^+ , organic N
 - P: PO_4^{3-} , Total P
 - BOD
 - TSS, VSS
 - Chloride
 - Alkalinity
- Water quality other Variables
 - Surface Chlorophyll *a*
 - Depth-integrated Chlorophyll *a*
 - Light attenuation coeff
 - Secchi depth
 - Turbidity: surface and depth-integrated
- Sampling frequency
 - Generally twice monthly from April through September
 - Originally went from March to December

Plankton Variables

- Plankton Variables
 - Surface Chlorophyll *a*
 - Chlorophyll *a*
 - Phytoplankton cell density by species
 - Phytoplankton biovolume by species
 - Microzooplankton (44 μm net) abundance by taxa
 - Macrozooplankton (202 μm net) abundance by taxa
- Sampling frequency
 - Generally twice monthly from April through September
 - Originally went from March to December

Fish Variables

- Trawl
 - 3 stations: twice monthly
 - Try-net bottom trawl with 15 foot horizontal opening, $\frac{3}{4}$ inch square body mesh and $\frac{1}{4}$ inch square cod end mesh
 - Towing speed 2-3 mph, tow length 5 minutes
 - Fish counted by species and measured to nearest 0.5 cm
- Seine
 - 3 stations: twice monthly
 - Beach seine 50 feet long, 4 feet high, knotted nylon with $\frac{1}{4}$ inch square mesh
 - Net pulled parallel to shore for 100 ft and then offshore end brought to shore
 - Fish counted by species and measured to nearest 0.5 cm
- Ichthyoplankton Tows
 - Semimonthly April – July
 - 333 um mesh net with 0.5 m opening
 - 6 minute tows
- Sampling frequency
 - Generally twice monthly from April through September
 - Originally went from March to December

Selected Additional Studies

- Submerged Aquatic Vegetation
 - Have relied in the past decade or so on VIMS flyover data
 - Some earlier data from our surveys and USGS
- Dye Studies and detailed bathymetry
 - Harper dissertation
- Continuous monitor at Pohick Bay Marina
 - Started in 2011
 - YSI 5500
 - Temperature, conductance, pH, DO, turbidity, chlorophyll
 - 15 minute intervals
 - Uploaded to web site
- Benthic sampling
 - Petite ponar grabs
 - 3-4 times per year
 - 3 samples per station
- C-14 primary production
 - From 1984 to 2002
 - Lab incubations at ambient temperature and 4 light levels
- SAV fish communities
 - Drop ring studies 2008/09
 - Published results
- Anadromous fish sampling in Pohick and Accotink Creeks
 - Ongoing in spring

Selected References

- Jones, R.C., D.P. Kelso, and E. Schaeffer. 2008. Spatial and seasonal patterns in water quality in an embayment-mainstem reach of the tidal freshwater Potomac River, USA: a multiyear study. *Environmental Monitoring and Assessment* 147: 351-375. (spatial analysis using original dense sampling network, also contains basic study references and methods)
- Jones, R.C. and R. Kraus. 2011. The ongoing monitoring program for the Gunston Cove area of the tidal freshwater Potomac River. Final Report to Fairfax County. 144 pp. (last report completed, 2011 report in prep. Discussion section includes trend analysis over all years)