The National Map Hydrography Revision for Louisiana/Mississippi Coast

Executive Summary

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DRAFT

The Louisiana and Mississippi Gulf coast is particularly dynamic and consequently its representation in the hydrography theme of The National Map deserves analysis. This is particularly true because most of this data is based on the USGS 7.5-minute topographic map series of the 1980’s, and 90’s. The 14 hydrologic subbasins spanning the coastline of these two states totals 7,053 miles of coastline. Of this, a full 6,900 miles, or 98%, has been determined to be in poor condition, which essentially means it is not usable.

The area is an extremely complex mixture of highly fragmented swamp, thousands of lakes within the swamps, many islands, many man-made channels, and many natural and engineered rivers and streams. To further complicate matters, the form of the landscape is highly susceptible to change. Much of that change is in the form of a highly recessed coastline in which many features no longer exist.

The bottom line is what would it take to fix this situation in The National Map? There are two basic approaches: (1) remap it similar to past rigorous practices, or (2) extensively simplify it. The problem with the first option is that the cost and complexity would be extensive enough to make the process not easily repeatable. The second option would not produce the highly detailed mapping content of the past, but it could be repeated regularly as the dynamic processes of this region make maps obsolete in a few years. The situation is basically a trade-off between content and currency. It is possible to have both, but then it becomes a trade-off between the Gulf and the needs of the rest of the nation.

The bottom line is $400,000 to get the maps up to currency. It provides a coastline, including islands, at typical 1:24,000-scale precision, but it gives up the highly complex representation within the coastal swamps. A new feature called “Area of Complex Swamp” would replace the hopelessly detailed swamps dotted with thousands of tiny lakes connected by an essentially useless flow network of current practice. All named features would be retained, as would any larger lakes, streams, canals, ditches, and other generally significant features. Also, a new feature “Indeterminate Coastline Interface” would classify the many miles of swamp/land interface with water that are nearly impossible to distinguish on NAIP, and almost as hard to distinguish on CIR, due to very shallow water and large amounts of vegetation. This provides a more truthful map a helps relieves the extreme cost of analysis in this situation whether manual or automated. The costal subbasins would be replaced, and conflated, rather than edited.

Then a recurring cost of perhaps 20% of the above method, or $80,000, would be needed every three years to keep the data current using NHD editing.

See attached spreadsheet:

See attached report by Bill Smith of the NGTOC:

See attached examples noted by the NGTOC:

See additional notes on the following page:

* The spreadsheet is broken into two sections. The first analyzes the coastline. The second analyzes the swamp/land using swamp area and lake area.
* The coastline was classified as (a) good, (b) fair, and (c) poor. A rate of 0.9 hours per mile was estimated to capture the cost of recompiling the poor coastline and processing it into a new NHD. This includes other associated fueatures.
* The swamp/land area interior to the coastline is best characterized by its complexity in terms of area of lakes and swamps. A rate of 0.4 hours was estimated for each to compile the new Area of Complex Swamp feature, which never-the-less still contains a lot of feature complexity.
* The resulting estimate comes to about $28,000 per subbasin. By comparison, the cost per typical subbasin when the original NHD was built, was about $28,000 per subbasin. These subbasins are considerably more complex than typical subbasins, but a new relaxed standard will be applied resulting in essentially a wash on costs.
* The estimates are based on a relaxed content standard, but still maintain 1:24,000-scale linework precision.
* Whether the coastline is compiled manually or in an automated fashion is basically a wash. Although automated techniques are initially efficient up-front, they become editing headaches when rendering.
* The feature Area of Complex Swamp is to be defined. The idea is to rationalize an extremely complex landscape and not spend countless hours defining something highly subject to change the next major storm.
* The feature Indeterminate Coastline Interface is to be defined. It is basically the waters at about a few feet deep that are penetrated by light and reflect the bottom on natural color imagery and to a large extent on color infra-red imagery. This coastline is extremely difficult to interpret (manually or spectrally) and can eat up much cost. It results in a lot guesswork by the analyst and often ends up as a misrepresentation on the map. So let’s just call it like it is “indeterminate.”
* Admittedly the rates used in the spreadsheet involve a lot of guess-work. But when used in conjunction with miles of coastline and areas of lakes and swamps, they lead to right kind of dynamics. Highly complex subbasins will cost more and easy ones will cost less. The assumption is that if a reasonably good mean is estimated, even with a huge standard deviation, there are enough features to allow the errors to cancel. If the rate is skewed too far either way, then obviously there will be real error. The best we can do is make an educated guess based on lots and lots of experience.
* The rates are loaded to include the post-processing necessary to rebuild a new NHD, although a “streamlined” NHD.
* Hourly rates based on NGTOC GS-11 Step 1 with burden.
* The cost to take the first option, to rebuild the traditional NHD, is probably two to three times the $400,000 estimate. The cost to make three-year updates is more than 20% of that because the feature complexity is far worse to deal with.
* Doing this is contingent on the right technology in place. The NGP would need to evaluate the technology to build a new NHD subbasin and use conflation.