Getting Started with the DMMT Tool **November 2017**

1. Navigate to the DMMT website http://warrenpinnacle.com/prof/SLAMM/NYSERDA2015/DMMT.html
2. Download the New York Case Study (**New York Dynamic Marsh Management Tool**)

Tasks:

1. **Understand Current Results**
   a. Download the pdf file with the current users guide and read through the details of the tool: DMMT Users' Guide
      i. For further information about the sites being modeled please see the Model Summary tab and New York City Parcels Summary
   b. The "**Model Inputs**" tab contains data gleaned from the "**Survey Questions**" tab. We will not change the inputs now but move into examining results.
   c. In the "**Model Outputs**" tab use the "Sort By" box to sort results by overall benefit.
      i. Which Sites Have the most possible wetland benefits in the modeled time period (regardless of adaptation strategy modeled)?

         _____

      ii. Which sites provide the most benefits for underserved communities?

         _____

   d. In the "**Ecosystem Service Benefits**" tab examine the components of each site's utility. Examine the "no migration" strategy:
      i. Based on the survey answers and SLAMM model predictions, what is predicted to be the largest component of wetland benefits from the Idlewild site over the time period modeled (2016-2100)?

         _____

      ii. What two components are most important in terms of benefits from W.T. Davis?

         _____

      iii. Which component is most important for Lemon Creek?

         _____

   e. Looking at "**Utility by Site over Time**," under "No Migration,"
      i. Which sites are predicted to lose the most benefits due to SLR over the simulation period?

         _____

      ii. If you change the adaptation strategy examined to "Migr. All Dry," what happens to the utility for Alley Creek?

         _____

iii. If you change the utility examined to look at "flood vulnerability reduction" only which site provides the most utility by 2100

_____

f. Looking at "**Utility by Strategy over Time**" for site "Idlewild Inner and Outer"
   i. Based on these model results, does marsh restoration to the 1974 boundary or Thin Layer Deposition seem a better strategy for maintaining future wetland benefits?

_____

g. Look at the "**Expected Value: Land Cover**" for first "W.T. Davis" under the no-action strategy ("No Migration.")
   i. This tab shows "expected value" land cover over time given uncertainty in sea-level rise rates and marsh accretion rates. What is expected to happen to this site's low marsh (saltmarsh)? What about the high marsh (transitional) and tidal flats (low tidal)?

_____

   ii. Keep an eye on the vertical axis and its units. Now switch to "Udalls Cove"
      1. Why does W.T. Davis have more wetland benefits overall than Udalls Cove

_____

      2. Overall are marshes predicted to increasing or decreasing at Udalls Cove

_____

      3. Under a strategy of "Restore to 1974" what happens to marshes at the beginning of the simulation

_____

h. Move to the "**Adaptation Strategy Benefits**" tab
   i. Which site has the largest capacity for increases to wetland benefits if inland migration is allowed

_____

   ii. Which site has the largest capacity for increases to wetland benefits under the "restore to 1974" adaptation strategy

_____

i. Move to the "**Incremental Benefits**" chart and look at the "Thin Layer Depo" adaptation strategy.
   i. Thin layer deposition is not predicted to be very beneficial by these model results but which site has the most potential for wetland benefits?

_____

j. Move to "**Current vs. Future Utility**" chart.
   i. Read over the description of this somewhat complicated graphic in the Users Guide.
   ii. Based on this run, for which sites can combined adaptation strategies potentially mitigate SLR losses by 2100?

_____

iii. For Idlewild which adaptation strategies would be required to "break even" in 2100 as compared to 2016 wetland benefits.

_____

k. Move to "**Benefits per Cost**" graph

i. Which strategy/site combinations sites provide the three highest wetland benefits per estimated cost?

_____

2. **Change Model Inputs and Assumptions and See the Effects**

a. These model results are interesting but they do not take into account the fact that some of these marshes are already declining in advance of significant accelerated SLR. If we assumed those marsh losses were to continue, what would be the effect on model results? Check the "Assume Historical Marsh Loss Rates Continue" box in Model Inputs and re-run the model.

i. Assuming historical marsh loss rates, which site provides the highest flood vulnerability reduction.

_____

ii. Based on this run, for which sites can combined adaptation strategies potentially mitigate SLR losses?

_____

iii. What happens to marsh fate at Udall's Cove?

_____

b. **Keep Marsh Loss Rates Checked.** Your organization is interested less in current marsh benefits and more in how to preserve marshes for future generations against SLR. For this reason you wish to look at what will best affect marshes in 2050 to 2100, when accelerated SLR is expected to be at its worst. Change the Beginning Year to 2050 in the Model Inputs tab and re-run.

i. What strategy will provide the greatest incremental benefit which is the greatest benefit per cost

_____

c. **Keep Marsh Loss Rates Checked; Return the "beginning year" to 2016.** You have some updated cost information for marsh restoration (1974). Your estimated costs are too high. Actual costs should be half (must be the volunteer labor and pro-bono engineering fees.). Also, negotiation with landowners at W.T. Davis suggests that actual purchase and restoration costs for developed and undeveloped lands will be double.

Change these costs in the "Model Inputs" tab and re-run.

i. Which adaptation strategy/site will now be most competitive in terms of cost per unit benefits?

_____

d. Keep the model as is. Given uncertainty in future SLR and future conditions, you would like to weight current marsh benefits above future marsh benefits. Set a discount rate of 1% and see the impact on model results.

i. How has the benefits over time changed from the original runs

_____

Final note: Many survey users citing lack of site-specific knowledge left site-specific values blank or weighted everything equally. However, some research is available to differentiate between sites. For example "Natural services to under-served" communities can be determined using the "SOVI index" (data on population adjacent to marshes.) Sequestration potential can be based on current marsh health indices (marsh density). Flood vulnerability reduction can be based on the amount of developed land contiguous to the site. Working with the site-specific values in conjunction with your own ecosystem service ranking can add additional precision and usefulness to this tool.