

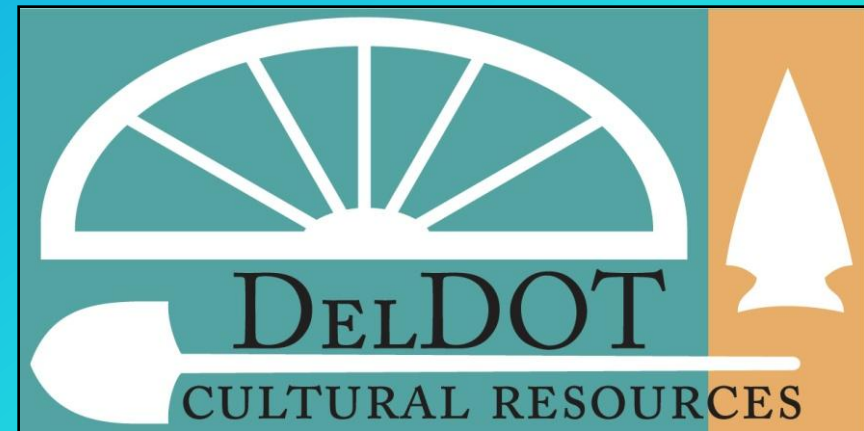
Climate Changes Impact to Archaeological Sites in Delaware: A Proactive Approach to Historic Preservation

by

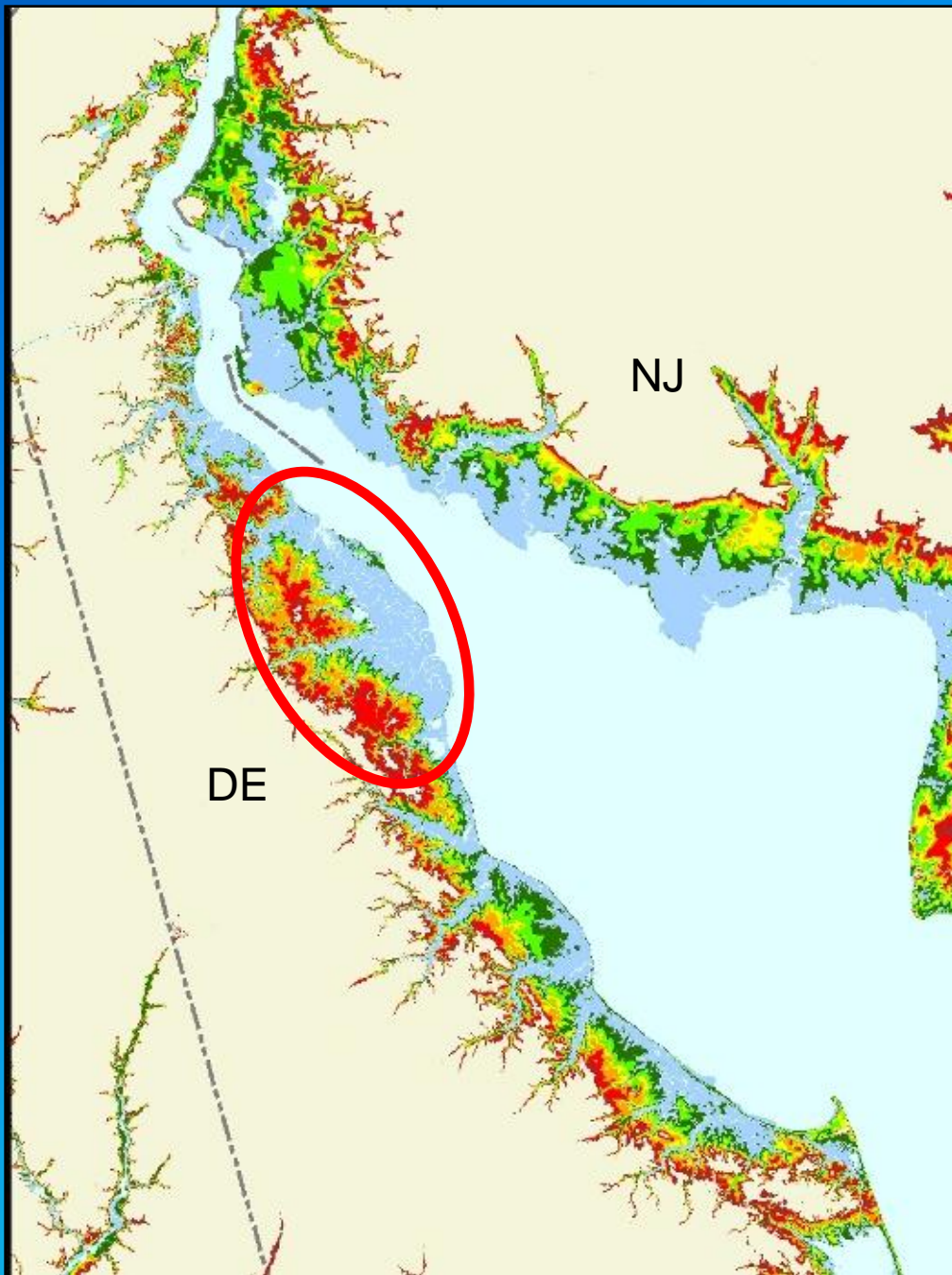
David S. Clarke

Delaware Department of Transportation Archaeologist

2011 MAAC



WWW.ARCHAEOLOGY.DEVDOT.GOV



ELEVATION IN METERS

BLUE – TIDAL WETLAND

GREEN – 0-2 METERS

YELLOW / ORANGE – 2-4 METERS

RED – 4-6 METERS

WHITE - UPLAND

http://maps.risingsea.net/view/1m_DE_Elev_noNTW.html

WETLANDS THAT WILL BE CONVERTED TO OPEN WATER

GREEN – NO

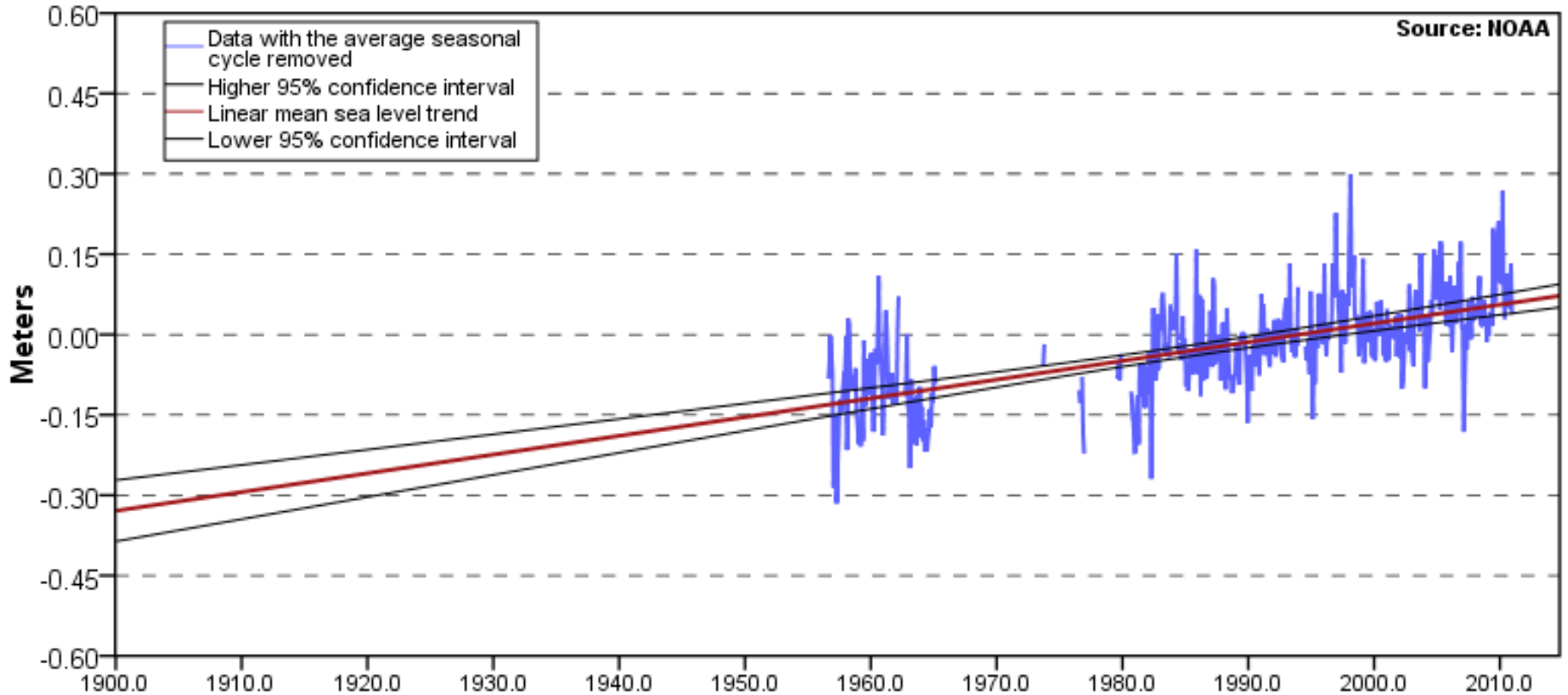
**BROWN – YES AT CURRENT SEA
LEVEL RISE RATES + 7MM PER
YEAR**

**RED – YES AT CURRENT SEA
LEVEL RISE RATES + 2MM PER
YEAR**

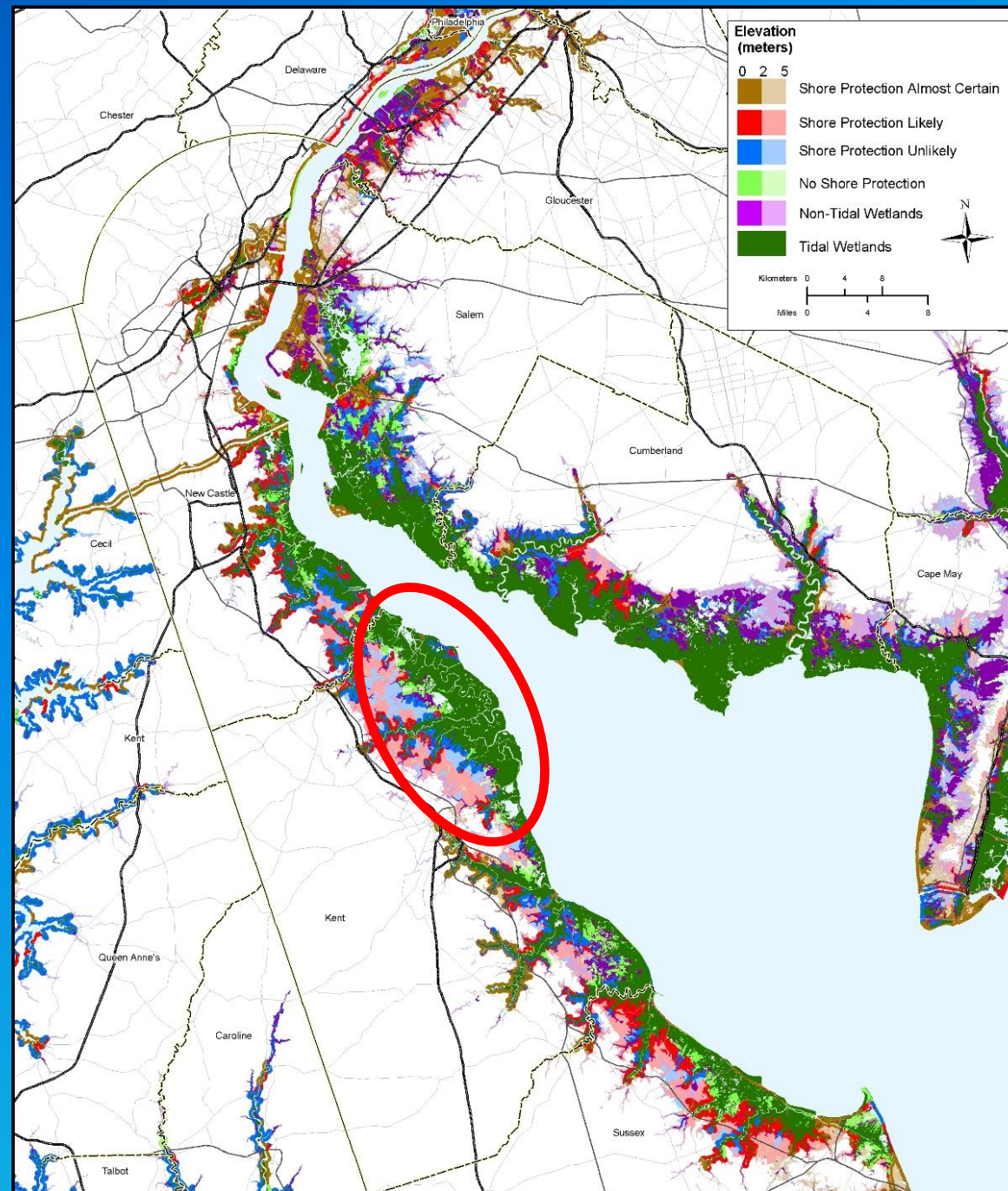


Reedy Point, DE

3.46 +/- 0.66 mm/yr



The mean sea level trend is 3.46 millimeters/year with a 95% confidence interval of +/- 0.66 mm/yr based on monthly mean sea level data from 1956 to 2006 which is equivalent to a change of 1.14 feet in 100 years. (NOAA.GOV)



GREEN – TIDAL WETLANDS

PURPLE - NON-TIDAL WETLANDS

http://plan.risingsea.net/ERL/S10_Delaware_Bay.jpg



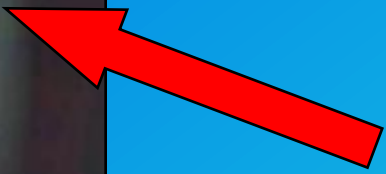
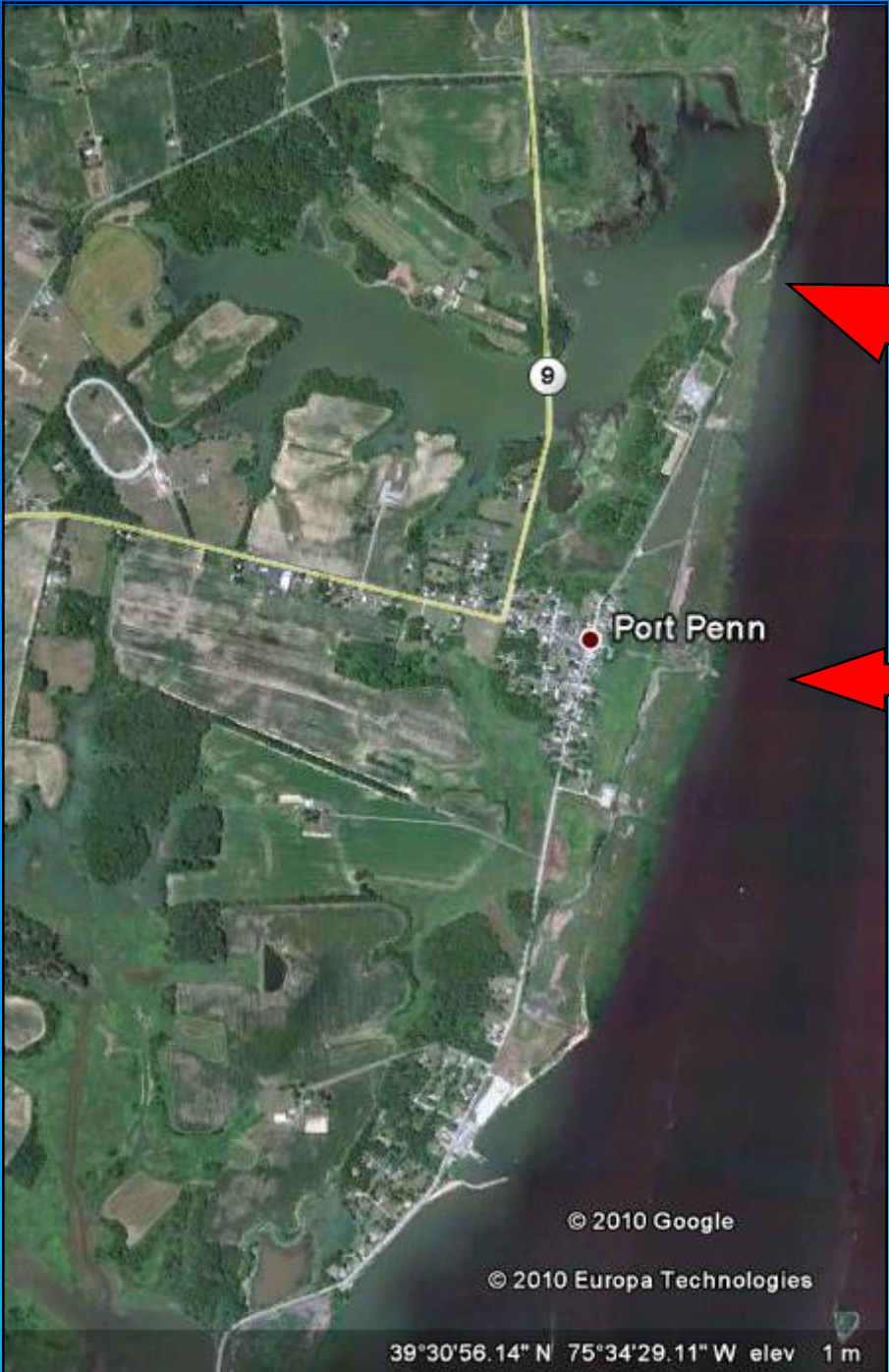
C AND D CANAL

ST GEORGES BRIDGE

ROUTE 9 CORRIDOR

**HISTORIC TOWN OF
PORT PENN**

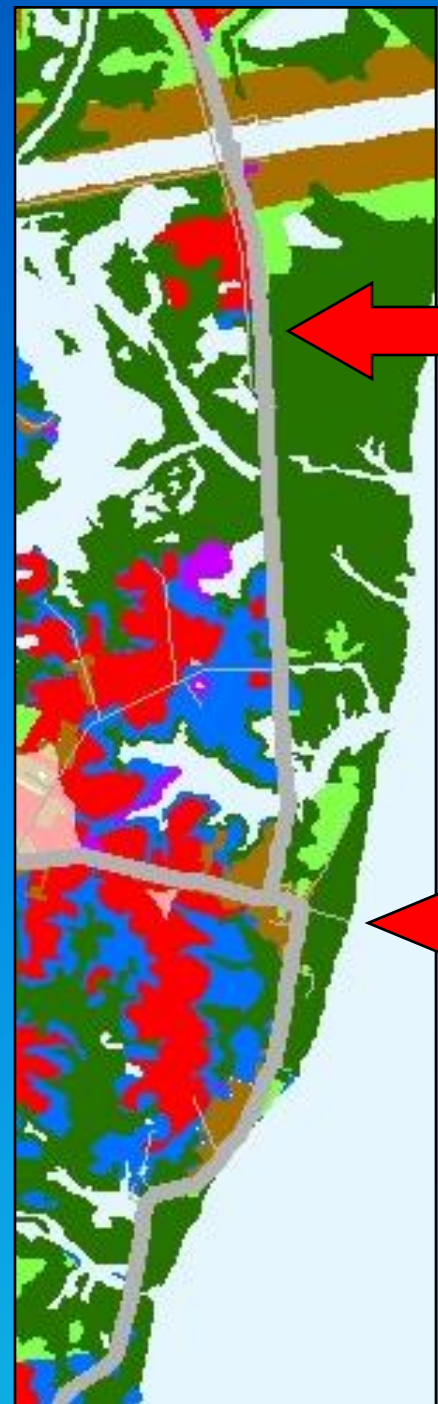
DELAWARE BAY



PINCH POINT



DELAWARE BAY



**ROUTE 9 CORRIDOR SOUTH OF THE
C&D CANAL AND ST. GEORGES
BRIDGE, NEW CASTLE COUNTY**

GREEN – TIDAL WETLANDS

**HISTORIC TOWN OF
PORT PENN**



<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

BR –
BROADKILL MUCKY PEAT,
VERY FREQUENTLY
FLOODED, TIDAL



ROUTE 9 CORRIDOR (IN YELLOW)

**BLUE DOTS ARE CULTURAL
RESOURCE POINTS FROM THE
DELAWARE STATE HISTORIC
PRESERVATION OFFICE'S GIS
BASED CHRIS SYSTEM**

**HISTORIC TOWN OF
PORT PENN**

SAA PRINCIPLES OF ARCHAEOLOGICAL ETHICS

“IT IS THE RESPONSIBILITY OF ALL ARCHAEOLOGISTS TO WORK FOR THE LONG-TERM CONSERVATION AND PROTECTION OF THE ARCHAEOLOGICAL RECORD BY PRACTICING AND PROMOTING STEWARDSHIP OF THE ARCHAEOLOGICAL RECORD. STEWARDS ARE BOTH CARETAKERS OF AND ADVOCATES FOR THE ARCHAEOLOGICAL RECORD FOR THE BENEFIT OF ALL PEOPLE; AS THEY INVESTIGATE AND INTERPRET THE RECORD, THEY SHOULD USE THE SPECIALIZED KNOWLEDGE THEY GAIN TO PROTECT PUBLIC UNDERSTANDING AND SUPPORT FOR ITS LONG-TERM PRESERVATION”

STEPS

STEP 1. – SHPO - WORKING WITH OTHER STATE AND FEDERAL AGENCIES (NOAA, FEMA, EPA, ETC...) DEFINES AREAS / REGIONS WHERE CLIMATE CHANGE WILL HAVE AN IMPACT

STEP 2. – CLIENT - SEE IF YOUR SECTION 106 COMPLIANCE PROJECT IS WITHIN ONE OF THESE DEFINED AREAS

STEP 3. – SHPO + CLIENT + OTHERS (ACHP), WRITE A MANAGEMENT PLAN ON HOW TO DEAL WITH THE PRIMARY, SECONDARY AND CUMULATIVE EFFECTS TO THE CULTURAL RESOURCES WITHIN THE PROJECT APE

MANAGEMENT PLAN EXAMPLE

TIER 1 – TAKE NO ACTION, LET NATURE
TAKES IT COURSE

TIER 2 – DO SOMETHING, PHOTO
DOCUMENT, RECORDATION, MINIMAL
EXCAVATION, ELIGIBLE SITES, ETC...

TIER 3 – PROTECT AT ALL COST, MITIGATE
THE RESOURCE, EXCAVATE THE SITE,
MOVE THE HOUSE, NHL PROPERTIES

*ANNUAL SITE VISIT / MONITORING *

NOW WHAT?

IDENTIFICATION

NEPA / SECTION 106

PROGRAMMATIC AGREEMENTS

SAA PRINCIPLES OF ETHICS

SHPO / THPO

MEMORANDUM OF AGREEMENTS

STATE / FEDERAL CONSULTATION