Sediment Budget Components

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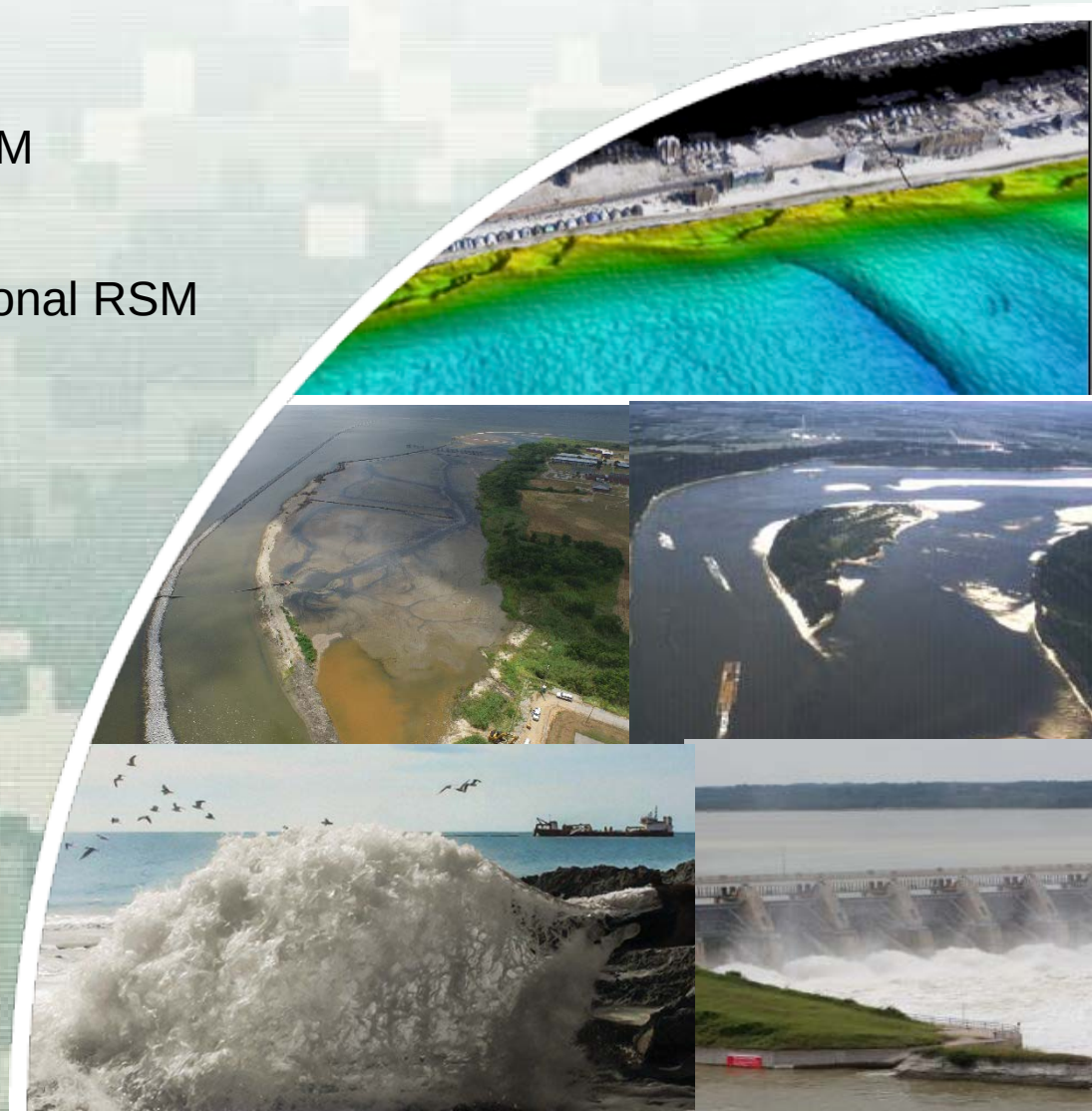


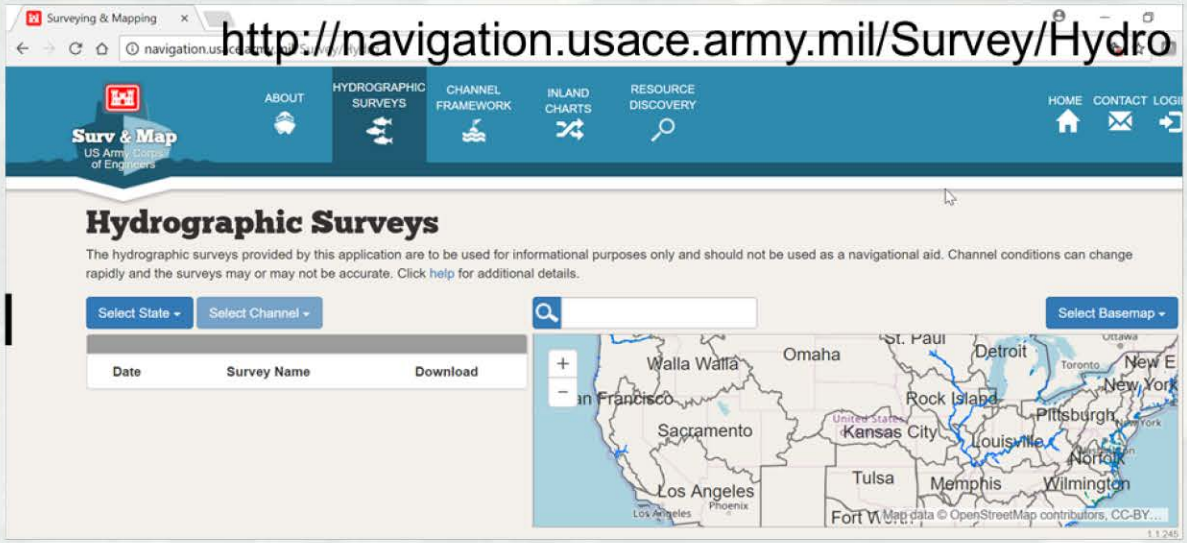
ERDC
Engineer Research and Development Center

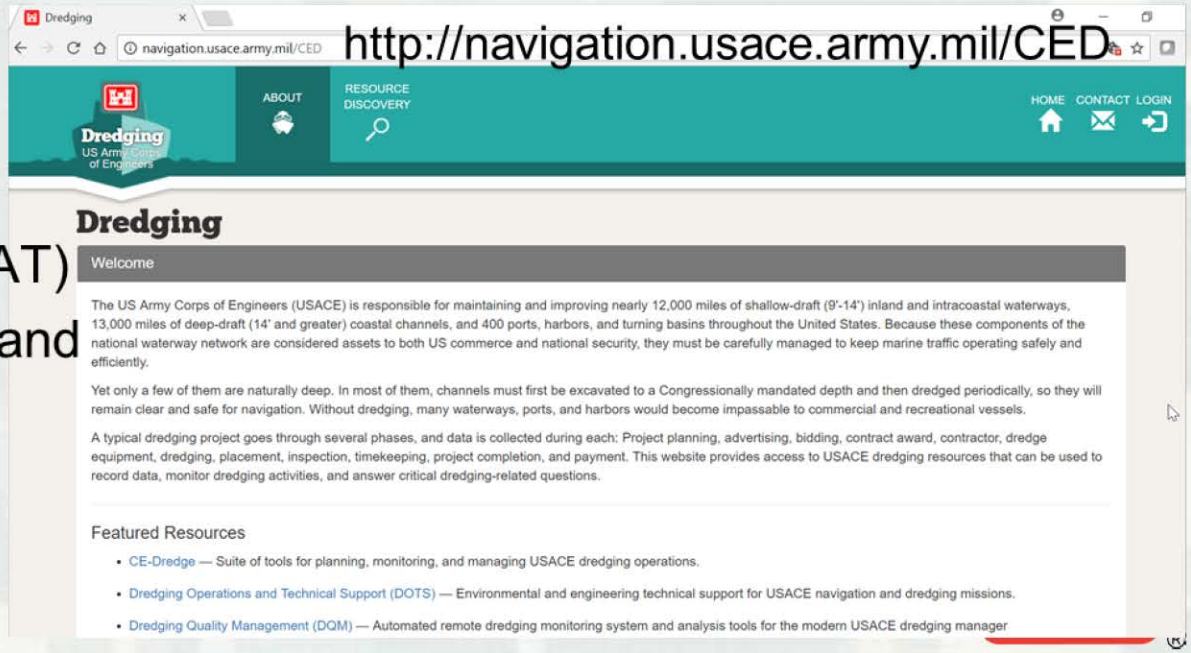
Sediment Budget Components

1. Dredging
2. Beach Nourishment
3. Beach Volume and Shoreline Chg
4. Inlet Morphology
5. Coastal Processes
6. Cross-shore Change
7. Sediment Budget

1. Dredging

- Conceptual
  - Reports, Dredging Database, Beachfill Database
  - CE-Dredge
- Interim/Operational
  - National Channel Framework & eHydro
    - Channel Condition Reports
  - Shoaling Analysis
    - Corps Shoaling Analysis Tool (CSAT)
    - Shoaling Patterns and Rates





1. Dredging

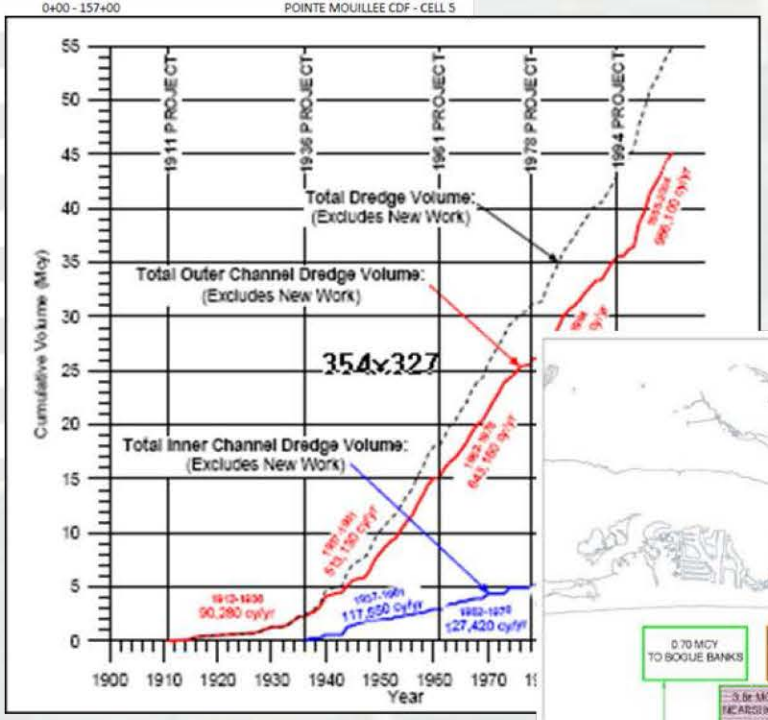
- Conceptual
- Dredging Reports

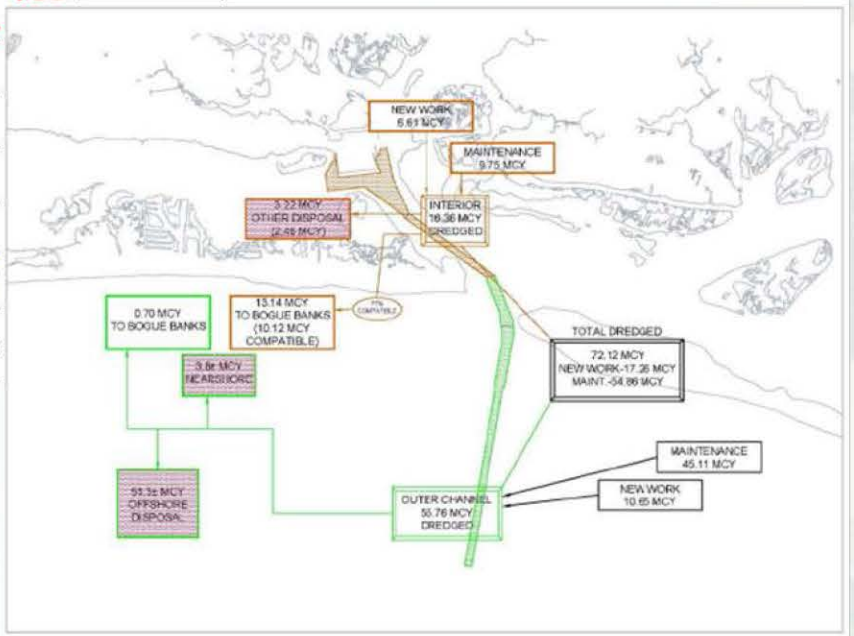
US Army Corps of Engineers

As of: 24-Mar-2014

CONTRACT DREDGING REPORT, DETROIT DISTRICT, OPERATIONS OFFICE

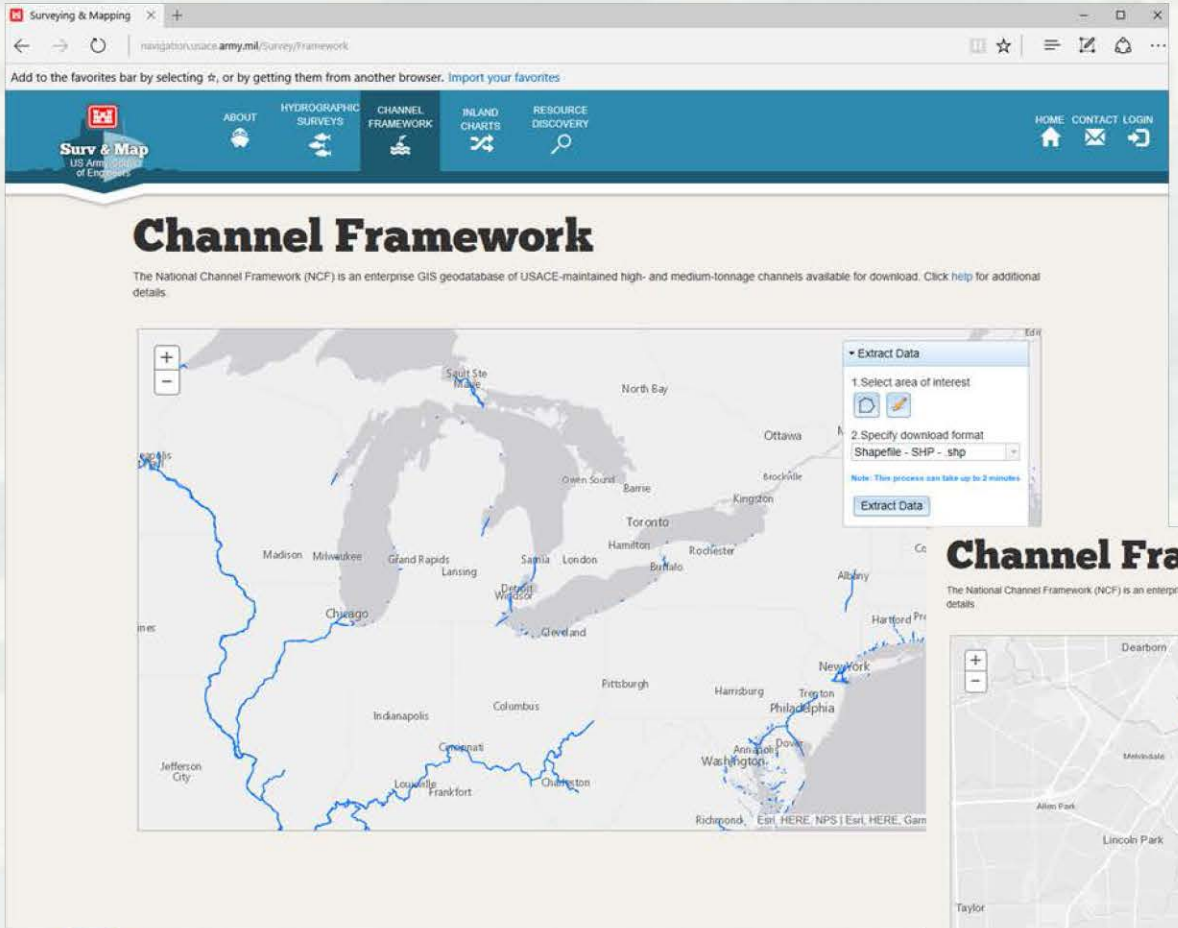
FY	START	COMPLETION	CUBIC YARDS	CONTRACT AMOUNT	CONTRACTOR CONTRACT NUMBER	DREDGE AREA	PLACEMENT AREA
Rouge River							
2012	8/3/2012	8/21/2012	39,951	$363,886	LUEDTKE ENGINEERING CO. W911XK-12-D-0008		Pt. Mouillee Confined Disposal Facility (CDF) Cell 5
2008	8/20/2008	9/4/2008	34,296	$612,147	LUEDTKE W911XK-08-C-0020	145+00-155+00 (13,419CY), 123+80-144+00 (14865CY), 92+00-123+80 (6012CY)	CONFINED POINTE MOUILLEE CDF CELL5
2006	9/25/2006	11/5/2006	64,000	$581,000	MCM MARINE(LUEDTKE) W911XK-06-C-0008	0+00-157+11	CONFINED PTE MOUILLEE CELL 5
2002	10/28/2002	11/25/2002	65,531	$609,248	MCM MARINE DACW35-02-C-0021	0+00-157+11	POINTE MOUILLEE CDF - CELL 5
1999	9/24/1999	10/20/1999	54,102	$501,714	LK MI CONT DACW35-99-C-0015	CRITICAL SHOALS	CONFINED
1997	9/12/1997	10/20/1997	74,162	$582,719	KING(SUB-LK MI CONT) DACW35-97-C-0025	0+00-157+00	POINTE MOUILLEE CDF - CELL 5
1995	8/1/1995	8/9/1995	33,592	$207,848	GREAT LAKES DACW35-95-C-0018	123+80-157+11	POINTE MOUILLEE CDF - CELL 5
1993	9/8/1993	9/17/1993	34,812	$248,524	GREAT LAKES DACW35-93-C-0020	90+00-157+00	POINTE MOUILLEE CDF CELL 5
1991	5/10/1991	6/9/1991	72,886	$721,530	KING DACW35-91-C-0007	0+00 - 157+00	POINTE MOUILLEE CDF - CELL 5
1989	8/28/1989	9/18/1989	52,974	$539,331	GREAT LAKES DACW35-89-C-0037		
1987	8/6/1987	8/10/1987	22,454	$304,724	GREAT LAKES DACW35-87-C-0010		
1986	7/11/1986	7/22/1986	59,357	$544,618	GREAT LAKES DACW35-86-C-0017		
1985	5/29/1985	6/13/1985	40,142	$474,586	DUNBAR & SULLIVAN DACW35-85-C-0020		
1984	6/22/1984	7/28/1984	57,013	$573,588	NATCO DACW35-84-C-0016		
1983			30,000	$190,000	GOVT/HAINS		
1982			44,310	$325,318	LUEDTKE DACW35-82-C-0054		
1981	5/6/1981	7/7/1981	115,549	$496,289	GOVT/HOFFMAN		
1980	7/31/1980	10/6/1980	117,997	$485,687	GOVT/LYMAN		
1979	6/19/1979	9/17/1979	134,083	$557,385	GOVT/LYMAN		
1978	9/25/1978	10/3/1978	13,677	$69,999	GOVT/LYMAN		
1978	7/5/1978	9/11/1978	152,845	$529,493	GOVT/HAINS		
1978	8/30/1978	9/1/1978	8,464	$31,999	GOVT/HOFFMAN		

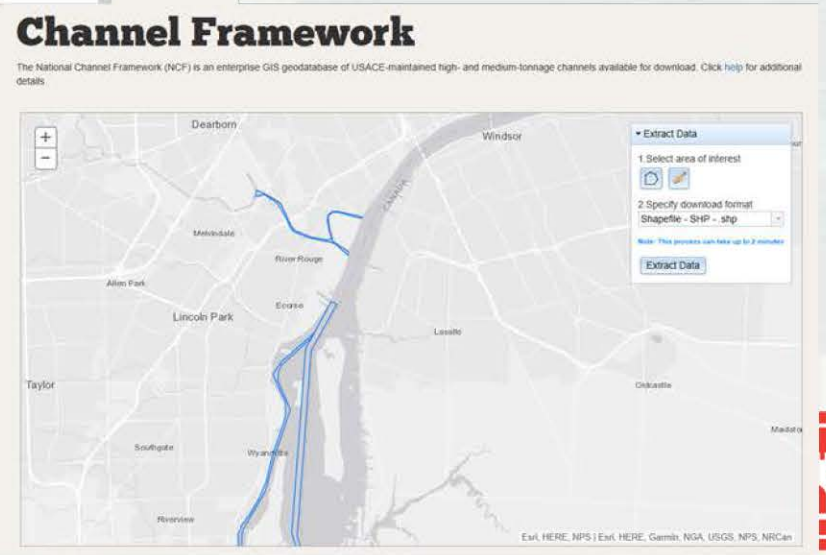




National Channel Framework

1. Dredging





- Interim/Operational
- Location of Channels
- Navigation Portal
- http://navigation.usace.army.mil/Survey/Framework

eHydro: Application and Reporting Process

1. Dredging

Metadata

```
Identification_Information:
  Citation:
    Citation_Information:
      Originator: U.S. Army, Corps of Engineers,
                  New England District (comp.)
      Publication_Date: 20090306
      Title: Boston Harbor, Boston, Massachusetts,
                  After Dredge/Condition Survey
      Geospatial_Data_Presentation_Form: map
      Series_Information:
          Series_Name: N/A
          Issue_Identification: N/A
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Web Site

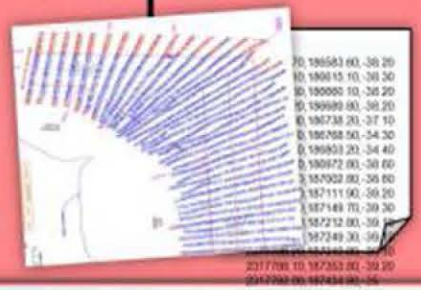
Web Services

District

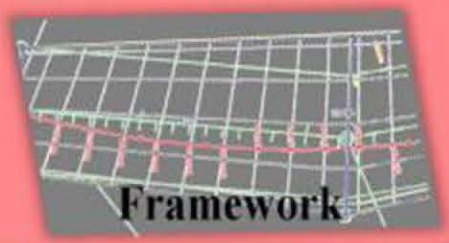
Planning Quantities

eHydro GIS Application

Enterprise Navigation Channel Framework



Surveys

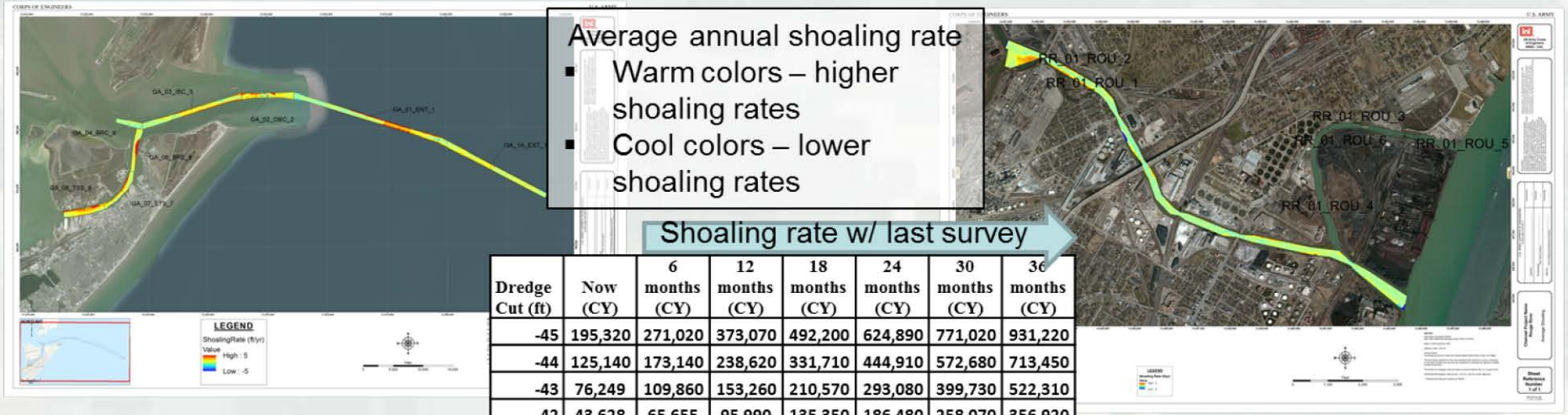


Framework

Channel Shoaling

1. Dredging

- *What will the channels look like in the future?*
- Corps Shoaling Analysis Tool
  - Use historical survey data from eHydro to generate difference grid sets between dredging events
  - Predict average shoaling rates and dredging requirements per channel reach
  - Report volumes at different depth/time intervals



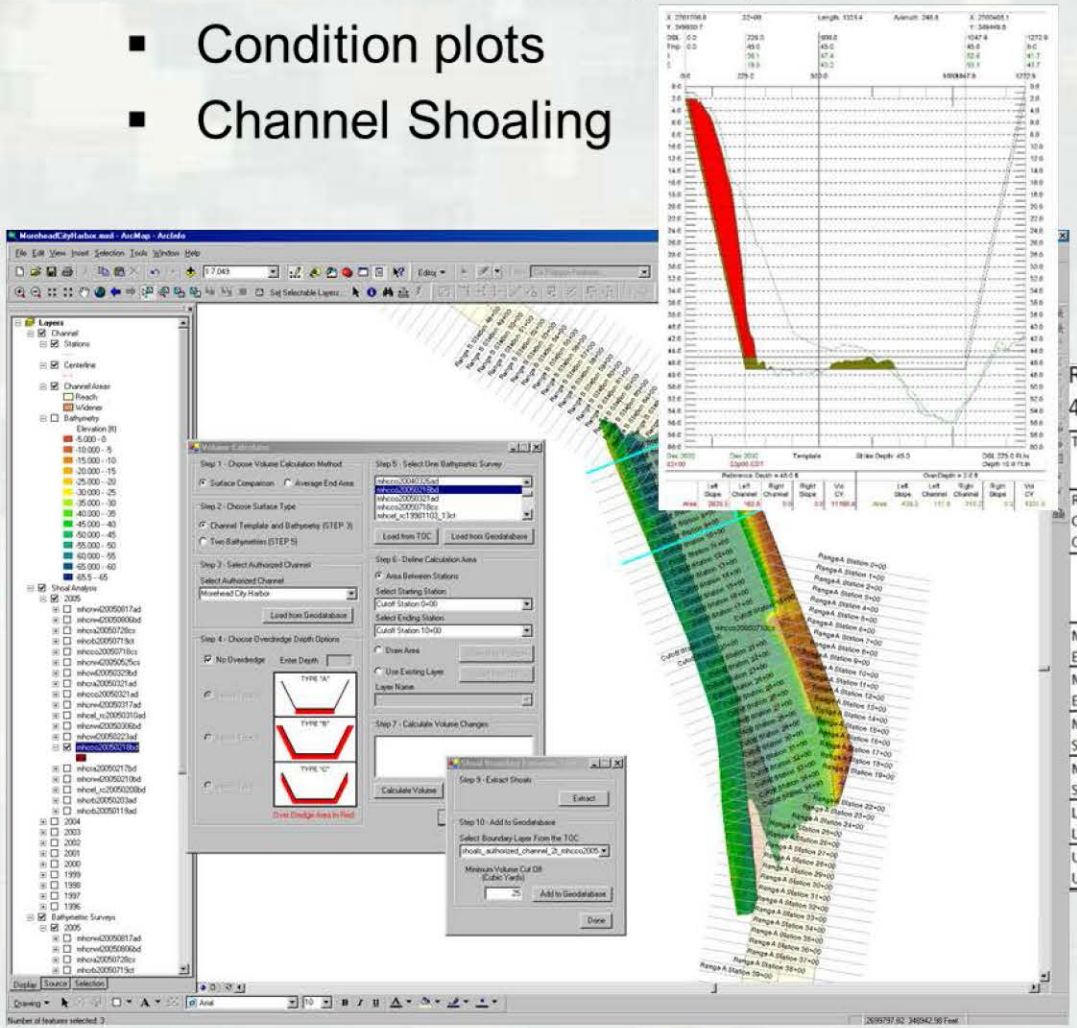
Average annual shoaling rate
- Warm colors – higher shoaling rates
- Cool colors – lower shoaling rates

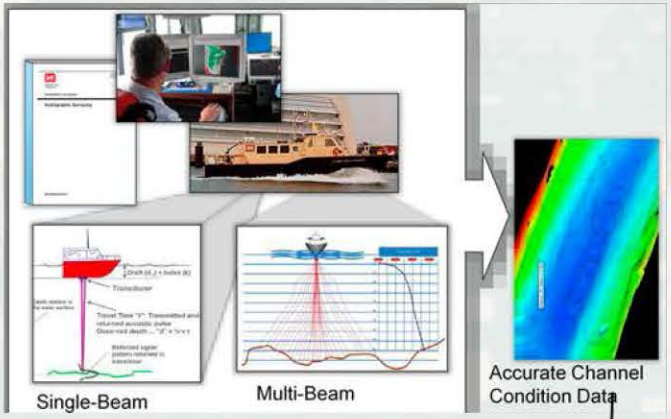
Shoaling rate w/ last survey

Dredge Cut (ft)	Now (CY)	6 months (CY)	12 months (CY)	18 months (CY)	24 months (CY)	30 months (CY)	36 months (CY)
-45	195,320	271,020	373,070	492,200	624,890	771,020	931,220
-44	125,140	173,140	238,620	331,710	444,910	572,680	713,450
-43	76,249	109,860	153,260	210,570	293,080	399,730	522,310
-42	43,628	65,655	95,990	135,350	186,480	258,070	356,920
-41	24,409	37,093	56,313	83,402	119,100	165,270	227,370
-40	14,958	21,022	31,470	48,147	72,041	104,370	146,170
-39	10,060	13,343	18,250	26,832	41,017	61,922	91,020
-38	7,083	9,092	11,945	16,084	23,035	34,823	53,059
-37	5,194	6,480	8,241	10,728	14,312	19,888	29,576
-36	3,865	4,787	5,944	7,496	9,673	12,784	17,358
-35	2,806	3,555	4,412	5,465	6,843	8,751	11,457

1. Dredging

- Interim/Operational
  - Channel Condition Report (CCR)
  - Channel Condition Index (CCI)
  - Channel Availability Reports
  - Condition plots
  - Channel Shoaling





REPORT OF CHANNEL CONDITIONS
400 FEET WIDE OR GREATER

Page 1 of 4
Date 3/3/2015

To: Navigation Interests

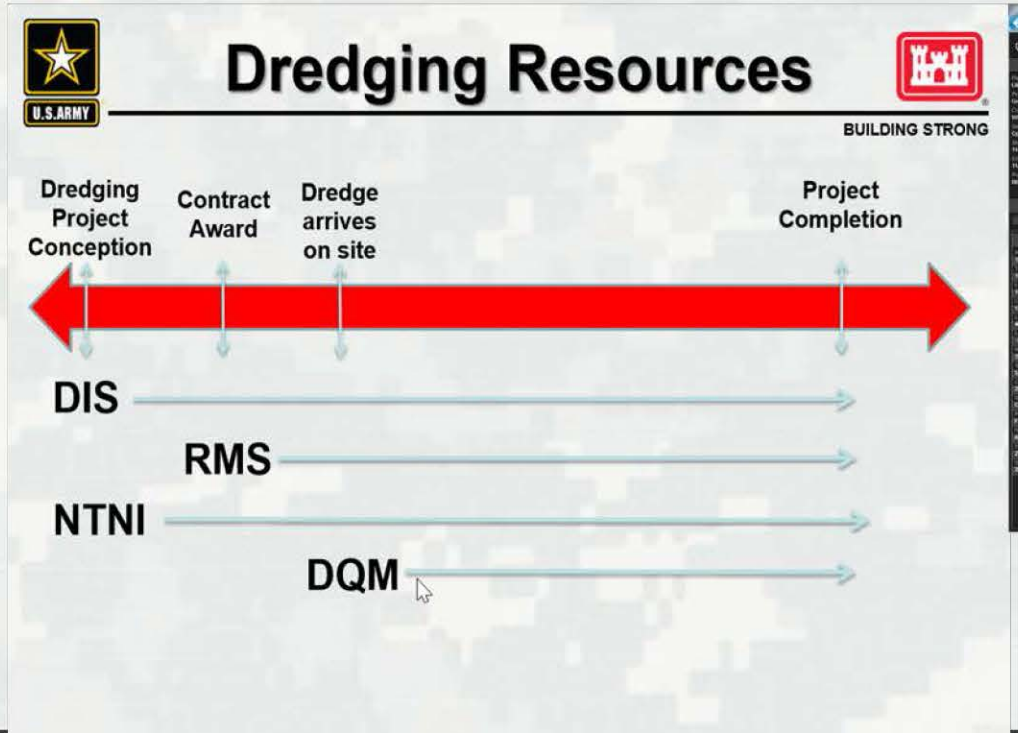
From: US Army Engineer District, Portland
333 SW First Avenue
Portland, OR 97204-3495

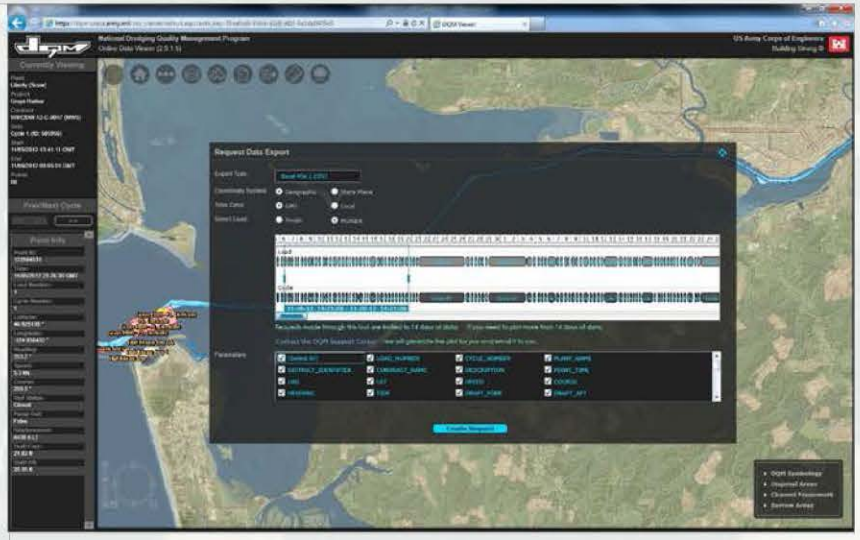
RIVER/HARBOR NAME AND STATE
COLUMBIA RIVER
OREGON & WASHINGTON

NAME OF CHANNEL	DATE OF SURVEY	AUTHORIZED PROJECT WIDTH (feet)	AUTHORIZED PROJECT LENGTH (miles)	AUTHORIZED PROJECT DEPTH (feet)	MINIMUM DEPTHS IN EACH 1/4 WIDTH OF CHANNEL ENTERING FROM SEAWARD: LEFT OUTSIDE QUARTER (feet)	LEFT INSIDE QUARTER (feet)	RIGHT INSIDE QUARTER (feet)	RIGHT OUTSIDE QUARTER (feet)
MOUTH OF COLUMBIA RIVER Entrance Range	11-07-2014	2000	3.30	55	51	51	52	
MOUTH OF COLUMBIA RIVER Entrance Range	11-07-2014	640	3.30	48				41
MOUTH OF COLUMBIA RIVER Sand Island Range	11-07-2014	2000	2.20	55	50	52	53	
MOUTH OF COLUMBIA RIVER Sand Island Range	11-07-2014	640	2.20	48				42
LOWER DESDEMONA SHOAL Lower Desdemona Shoal	02-18-2015	600	3.40	43	46	47	49	50
UPPER DESDEMONA SHOAL Upper Desdemona Shoal	01-22-2015	600	3.60	43	42	44	43	41

1. Dredging

- Interim/Operational
- DIS – Dredging Information System – overall project info for all USACE performed & contracted dredging projects
- http://www.navigationdatacenter.us/dredge/dredge.htm
- RMS - Resident Management System – automated construction management/quality assurance information system primarily oriented to the daily requirements of USACE field-level construction personnel
- http://rms.usace.army.mil
- Dredging Quality Management – http://dqm.usace.army.mil



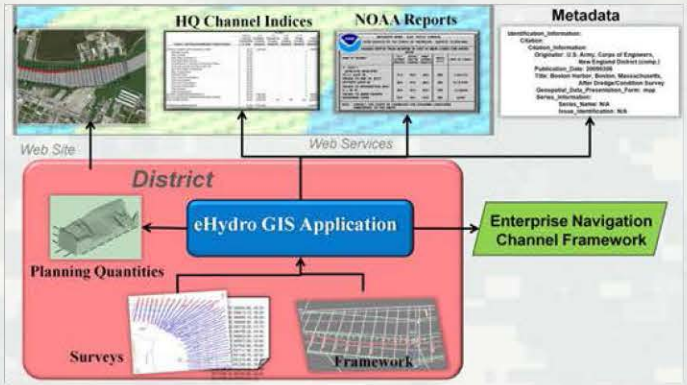


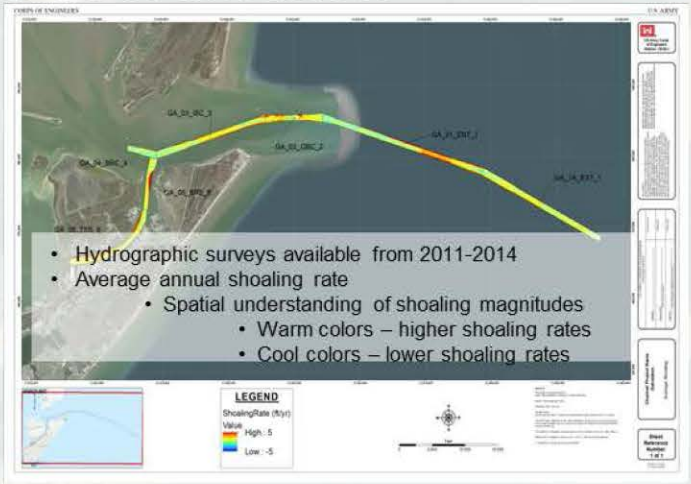
1. Dredging

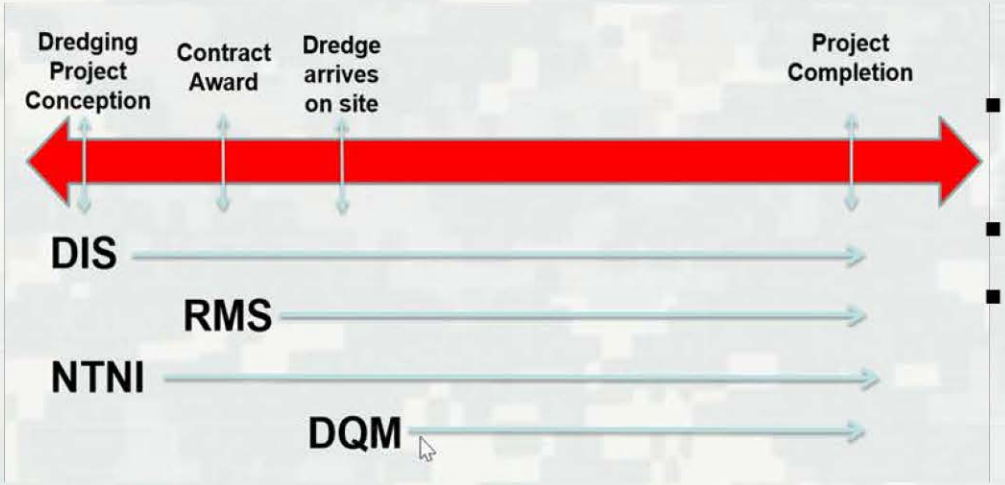
- Big Picture

$$\sum Q_{source} - \sum Q_{sink} - \Delta V + P - R = \text{Residual}$$

- Dredging records available online, local district
- Improve dredging communication and coordination







- http://www.navigationdatacenter.us/dredge/dredge.htm
- http://rms.usace.army.mil
- Dredging Quality Management – http://dqm.usace.army.mil