Development of Technical Guidance on Unique Identifiers for Mapping and Monitoring Wetlands

WMC Webinar
January 18, 2012

Conservation Management Institute (CMI)

Jane Awl

What are Unique Identifiers?

"With reference to a given (possibly implicit) set of objects, a **unique identifier** (**UID**) is any identifier which is guaranteed to be unique among all identifiers used for those objects and for a specific purpose" (from Wikipedia 04-20-2011).

Identifiers generally include numbers, codes and names.

“Unique” Identifiers

- Unique in this sense does NOT refer to “Special” Wetlands

- Unique Identifiers means they are names and codes that are Non-Repeated, Not Redundant.

Problem to be Addressed

Currently there are no nationally-accepted standards, conventions, protocols, or tools for creating wetland site names and other stable (not likely to change within a defined set) unique identifiers to allow individual wetland sites and corresponding geographic features (e.g., points, polygons) to be effectively tracked, monitored and reported on over time, and to enhance system interoperability between federal agencies, states, tribes, and contracted partners, to facilitate data sharing at a national scale.

Implementation Plan for the

FGDC Wetlands Mapping Standard Version 1.0:

First Approximation

This is a dynamic document - please check for the most recent version online at http://www.fws.gov/wetlands/.

NSDI CAP 2011 Project Description

Technical Guidance on Unique Identifiers for Wetland Mapping Standard Implementation, Outreach and Training Materials http://www.fgdc.gov/grants/2011CAP/projects/G11AC20060

Purpose

The purpose of this project is to carry out key recommendations included in the Implementation Plan for the FGDC Wetland Mapping Standard adopted in July of 2009.

There are two objectives:

1) Develop technical guidance for handling and tracking wetland unique identifiers (*language from FGDC Wetland Mapping Standard*) to support tracking polygon lineage and change, and to enhance system interoperability between federal agencies, states, tribes, and contracted partners, to facilitate data sharing at a national scale (*language from Implementation Plan*).

2) Develop implementation recommendations.

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Desired Outcomes

- Address a significant technical challenge documented in the current version of the Wetlands Mapping Standard prior to the next five year maintenance review cycle for the Wetlands Mapping Standard (so the results can be considered when updating the Mapping Standard), and in coordination with the ongoing maintenance review of the Wetlands Classification Standard.
- Help improve and modernize the NSDI Wetlands Layer.
- Enhance system interoperability between federal agencies, states, tribes, and contracted partners, to facilitate data sharing at a national scale (per Implementation Plan).
- Improve database capabilities to track polygon lineage and polygon change over time (per Implementation Plan).
- Enhance capabilities for associating wetland geographic data with other data sets (such as water quality and monitoring data), expanding the possibilities for analysis (per Public Review document).
- More effective tracking, monitoring and reporting on over time for individual wetland sites and corresponding geographic features (e.g., points, polygons) .
- Increase availability of wetland information for analyzing and identifying solutions to wetlands and water resources management, conservation and protection issues.

Partner Organizations

- FGDC Wetlands Subcommittee including:
  - U.S. Fish and Wildlife Service
  - U.S. Environmental Protection Agency
  - U.S. Army Corps of Engineers
  - U.S. Geological Survey
- National Wetlands Monitoring and Assessment Working Group (NWMAWG)
- Association of State Wetland Managers (ASWM)
- Wetlands Mapping Consortium (WMC)
- Ducks Unlimited (DU)
- Kentucky Division of Water

Methods

- CMI will work with members of the affected wetlands science community to develop and vet technical guidance for creating wetland site names and other stable unique identifiers applicable to national-scale wetland tracking and monitoring needs.

- CMI will present this information at relevant national and/or regional professional meetings and webinars.

- CMI will provide a final report (Technical Report) on the technical guidance with implementation recommendations.

- The technical guidance and implementation recommendations resulting from this project may be used to update the implementation plan, training materials, and/or outreach materials for the Wetlands Mapping Standard, and will be made available through the WMC and /or the ASWM web sites.

Options

Unique (Non-Repeated) Site Names

- Feature Extent?
  - Whole or Continuous wetland
  - NWI polygons
  - Monitoring Sites
  - Monitoring Points
  - Other?

- Site Name Type?
  - Common (e.g., Tract, Owner, Geographic Features)--prevention of redundancy?
  - Scientific/Taxonomic--avoid including information that may change over time like community type?
  - Codes –types? Implementation?

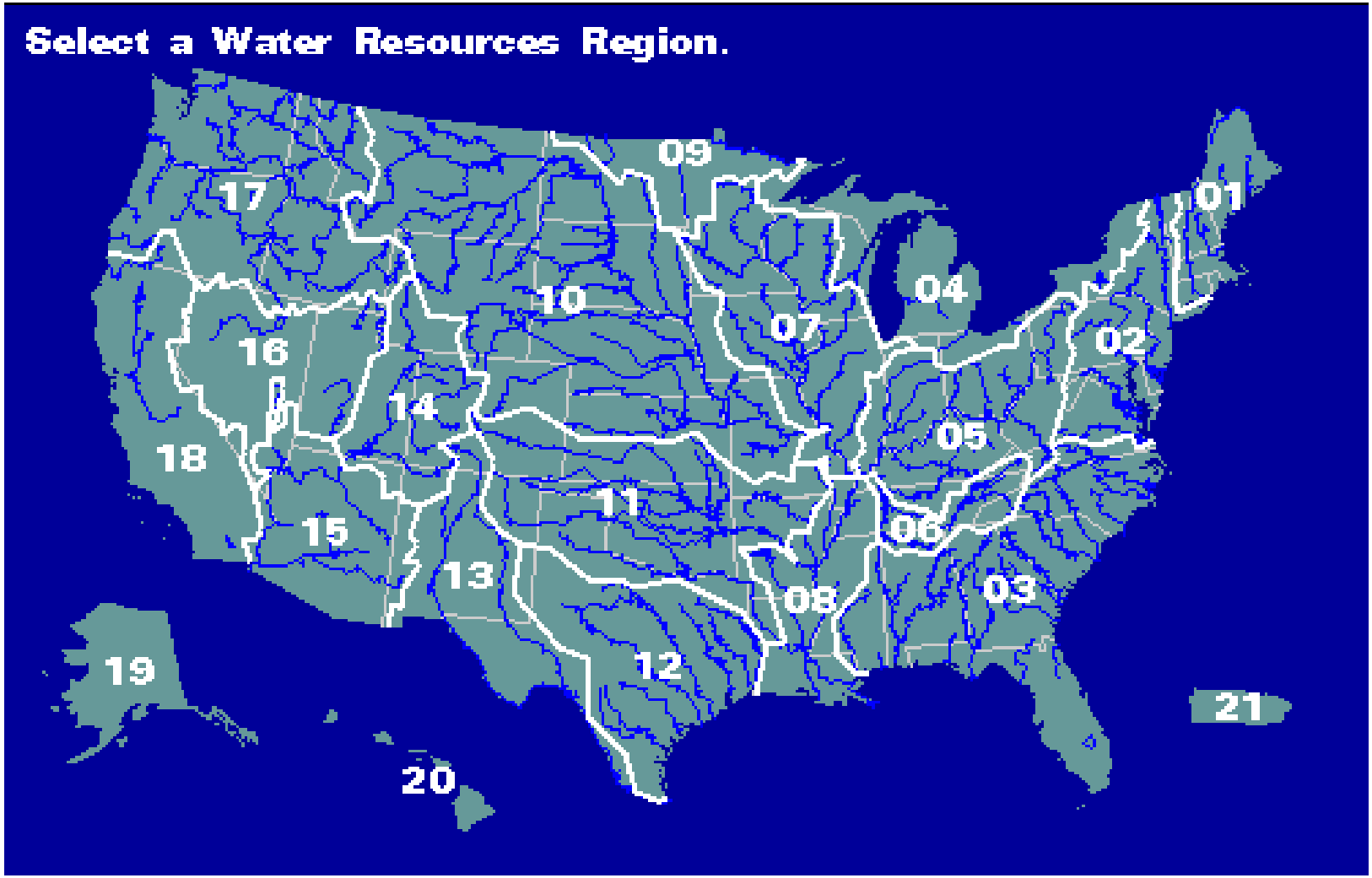
Options
Codes

TYPE?

- **Stable Sequential** [10000001, 10000002…] (currently polygon identifiers are Dynamic —not stable, they are regenerated and change with data versions)
  - Management to prevent duplication?
  - Fixed Length? Or Variable Length as more polygons are added/updated?
- **Hierarchical (Levels? Key to generate code?)**
  - Fixed Length? Or Variable Length to reflect changes over time (parent-child relation of polygons)?
- **Information-rich (Must avoid redundancy)**
  - Political Boundaries (State, County, Local)
  - Geographic Coordinates (Of what point? Centroid? Consider variation in polygon extent and shape?)
  - HUC/Hydrologic Unit Codes (length/digits?)
  - Other?

Hydrologic Unit Codes (HUC)

8-digit, 10-digit, and 12-digit Codes



Implementation
for Stable Wetland Unique Identifiers

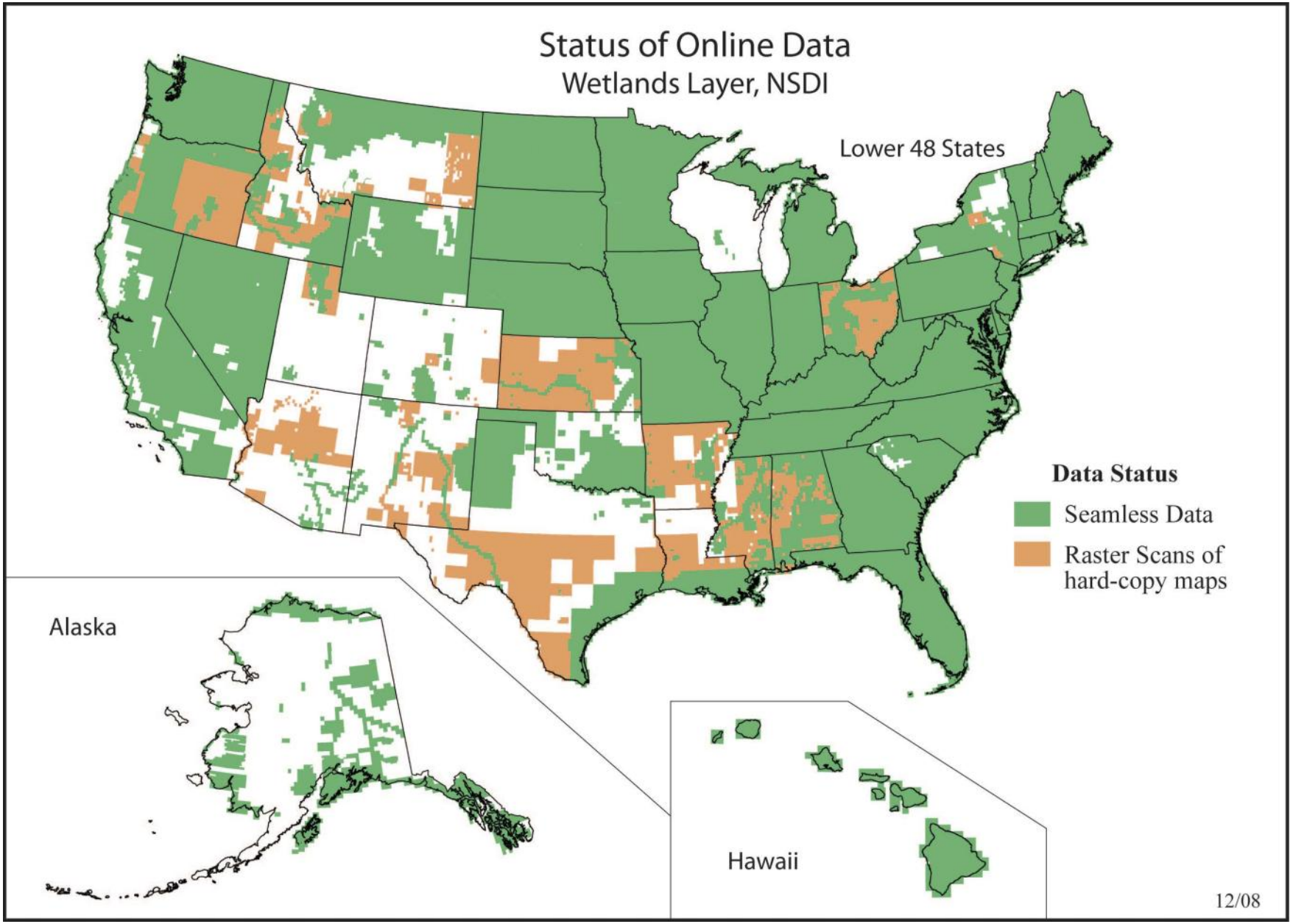
HOW?

- Database Modification (e.g. add fields, relational tables, etc.)
  - Which Database (NSDI, NWI, State, or by Project?)
- Generation of code on the fly (by applications or tools)
  - NSDI, NWI, State, or Project level?
- Other?

Project Examples

Denise Clearwater

Robb Macleod


Status of Online Data
Wetlands Layer, NSDI
Lower 48 States
Data Status
Seamless Data
Raster Scans of hard-copy maps
Alaska
Hawaii
12/08

Modified NWI Attribute Table

(via Denise Clearwater)

Attributes of wetlands_Mattawoman

FID	Shape *	WMC_ID	CLASS	Shape_Leng	Shape_Area	Org_year	Field_V_1	Field_V_2	UpdateYear	UPD_YR_2
0	Polygon		PFO1A	25526.637346	1394549.77659					
1	Polygon		U	1791.94142	36207.46032					
2	Polygon		U	344.012852	7126.136493					
3	Polygon		PFO1C	3562.494923	186309.230596					
4	Polygon		U	65067.775272	22833698.7734					
5	Polygon		PFO1E	3873.251527	137986.465159					
6	Polygon		U	1408.339495	18096.079931					
7	Polygon		PFO1A	6034.68456	349663.348962					
8	Polygon		PSS/FO1C	276.083001	4441.843063					
9	Polygon		PFO1C	2386.487743	96826.300428					
10	Polygon		PSS/FO1C	180.600691	1865.016883					
11	Polygon		PFO1A	371.288308	5931.812241					
12	Polygon		PFO1A	207.877145	2147.113718					
13	Polygon		U	254.938779	3642.073456					
14	Polygon		PFO1C	366.882669	6452.13346					
15	Polygon		PEM1/SS1Fh	713.591403	26040.855414					
16	Polygon		PSS1A	748.38179	25601.215236					
17	Polygon		PFO1Fh	1249.413661	59999.034321					
18	Polygon		PFO1E	4969.985558	172145.313539					
19	Polygon		PFO1C	8421.152862	311432.582196					
20	Polygon		PFO1Ch	1489.771449	57065.091589					
21	Polygon		U	449.292999	4779.513385					
22	Polygon		PEM1A	1467.317225	30097.517151					
23	Polygon		PFO1/EM1E	373.760832	4868.598643					
24	Polygon		PFO1F	741.427812	14209.663438					

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Updating and Tracking Wetlands

Example of Unique Identifier use in a Wetlands Mapping Database

Robb Macleod
Ducks Unlimited

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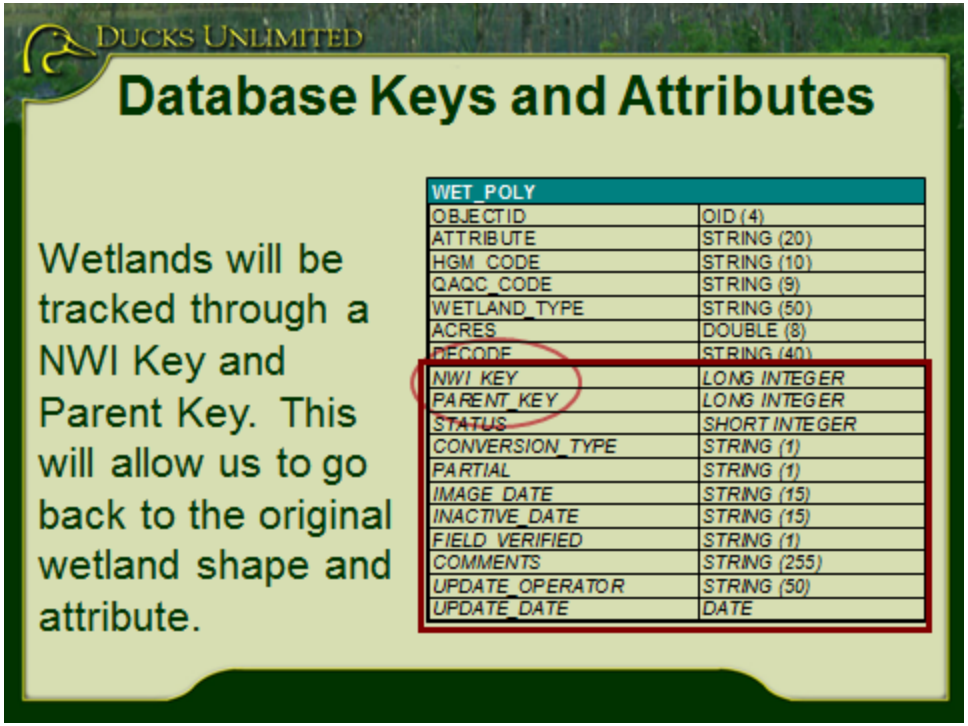
Database Keys and Attributes

Wetlands will be tracked through a NWI Key and Parent Key. This will allow us to go back to the original wetland shape and attribute.

WET_POLY	
OBJECTID	OID (4)
ATTRIBUTE	STRING (20)
HGM_CODE	STRING (10)
QAQC_CODE	STRING (9)
WETLAND_TYPE	STRING (50)
ACRES	DOUBLE (8)
DECODE	STRING (40)
NWI_KEY	*LONG INTEGER*
PARENT_KEY	*LONG INTEGER*
STATUS	*SHORT INTEGER*
CONVERSION_TYPE	*STRING (1)*
PARTIAL	*STRING (1)*
IMAGE_DATE	*STRING (15)*
INACTIVE_DATE	*STRING (15)*
FIELD_VERIFIED	*STRING (1)*
COMMENTS	*STRING (255)*
UPDATE_OPERATOR	*STRING (50)*
UPDATE_DATE	*DATE*

DU added 11 attributes to the official NWI attributes.

- The NWI Key is a unique number for each wetland.
- The Parent Key keeps track of wetlands that changes over time.
- The Status attribute allow us to query active wetlands from inactive (converted) wetlands.
- Conversion type allow us to identify how it was converted (urban, Ag, etc.). Partial identifies wetlands that were only partially converted (part of the wetlands is still active).



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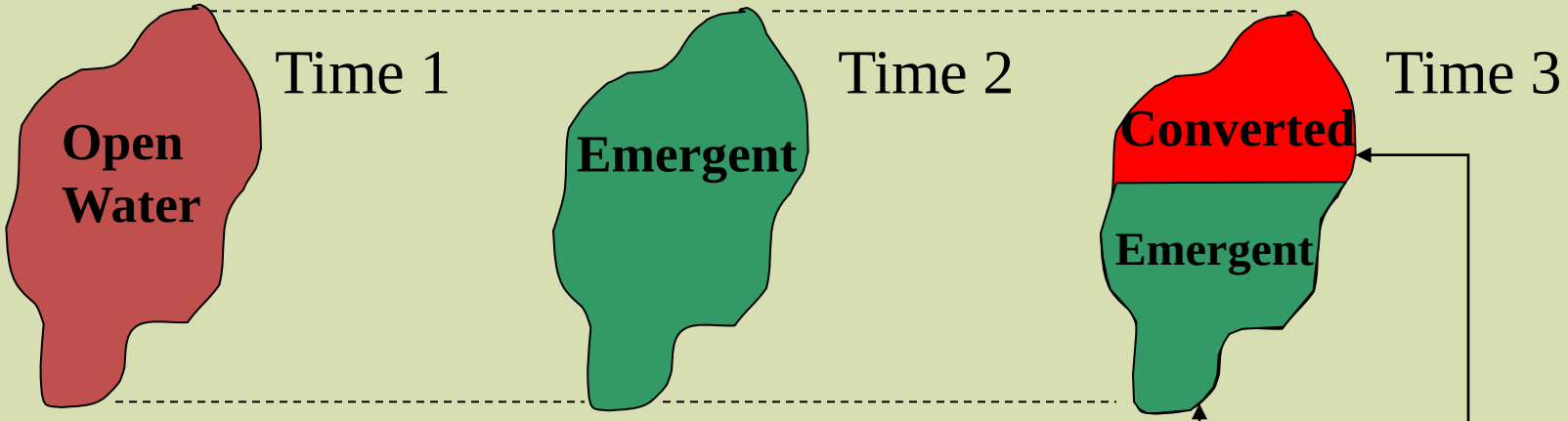
Database Keys and Attributes

Status will allow us to determine if the wetland is “active” (currently exists) or “inactive” (been converted).

WET_POLY	
OBJECTID	OID (4)
ATTRIBUTE	STRING (20)
HGM_CODE	STRING (10)
QAQC_CODE	STRING (9)
WETLAND_TYPE	STRING (50)
ACRES	DOUBLE (8)
DECODE	STRING (40)
NWI_KEY	*LONG INTEGER*
PARENT_KEY	*LONG INTEGER*
STATUS	*SHORT INTEGER*
CONVERSION_TYPE	*STRING (1)*
PARTIAL	*STRING (1)*
IMAGE_DATE	*STRING (15)*
INACTIVE_DATE	*STRING (15)*
FIELD_VERIFIED	*STRING (1)*
COMMENTS	*STRING (255)*
UPDATE_OPERATOR	*STRING (50)*
UPDATE_DATE	*DATE*

NWI Key/Parent Key Example



WET_POLY	
OBJECTID	
NWI Key = 101	
DRAINAGE_TYPE	
PARTIAL	
IMAGE_DATE	1978
FIELD_VERIFIED	
COMMENTS	
UPDATE_OPERATOR	
UPDATE_DATE	

WET_POLY	
OBJECTID	
NWI Key = 102 Parent Key = 101	
FIELD_VERIFIED	
COMMENTS	
UPDATE_OPERATOR	RDM
UPDATE_DATE	2005

WET_POLY	
OBJECTID	
NWI Key = 103 Parent Key = 102	
FIELD_VERIFIED	N
COMMENTS	
UPDATE_OPERATOR	RDM
UPDATE_DATE	2007

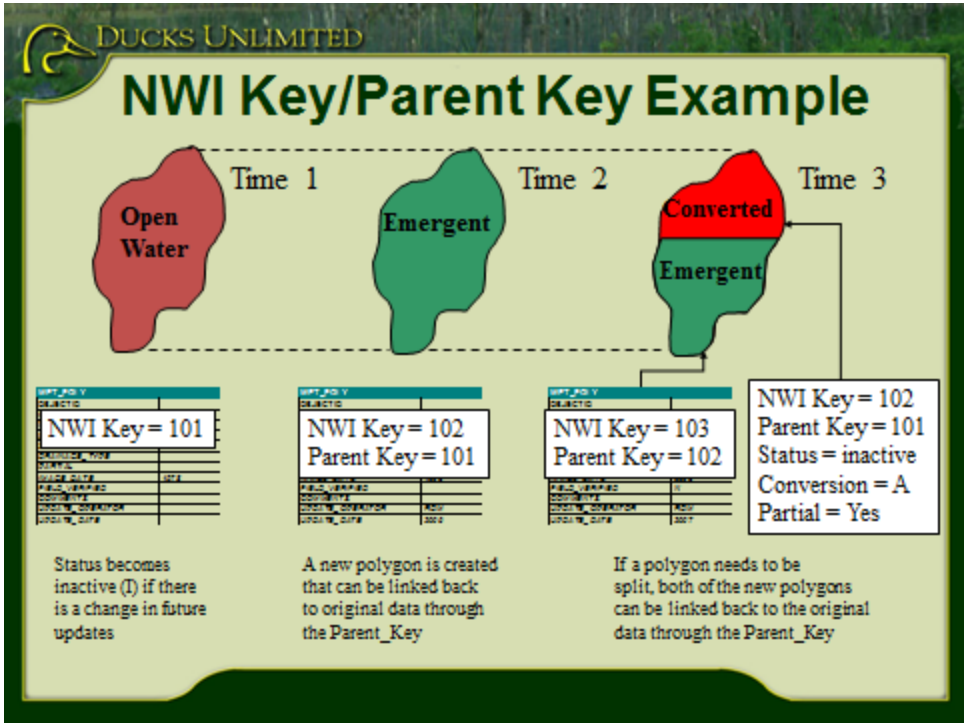
NWI Key = 102
Parent Key = 101
Status = inactive
Conversion = A
Partial = Yes

Status becomes inactive (I) if there is a change in future updates

A new polygon is created that can be linked back to original data through the Parent_Key

If a polygon needs to be split, both of the new polygons can be linked back to the original data through the Parent_Key

Time 1 is the original wetland with a unique ID (NWI Key = 101). In Time 2, the wetland changed from open water to emergent, so the wetland polygon is copied and pasted (now have two overlapping polygons). The original wetland (polygon) is inactivated and the new wetland polygon has a new NWI Key (unique ID) and Parent Key that equals the NWI key of the original. This allows us to summarize the changes in class and links the original with the changed wetland.



In the case where part of the original wetland is converted, the original wetland is copied and pasted, the new polygon is reshaped. The original polygon in inactivated with a conversion type (A – Agriculture) and the partial attribute is Yes. The new polygon has a new NWI Key and Parent Key that equals the NWI Key of the original.

Other
Project Examples?
Case Studies?

Milestones
(Deliverables and Schedule)

- Outreach (via presentation, webinar, and/or publication) on request for information (Summer 2011-Winter 2012)
- Interim Progress Report (October 2011)
- Options for Wetland Site Names and Other Unique Identifiers disseminated to affected wetland science community for comment (Spring-Summer 2012)
- Outreach (via presentation, webinar, and/or publication) on the Options for Wetland Site Names and Other Unique Identifiers (Spring 2011- Summer 2012)
- Final Technical Report with guidance and implementation recommendations (Summer 2012)
- Outreach (via presentation, webinar, and/or publication) on Technical Report (Summer 2012)

Outreach

- 2012
  - State/Tribal/Federal Wetland Coordination Meeting March 13-15, Shepherdstown, WV
  - National Water Quality Monitoring Council Meeting, April 30 – May 4, Portland, Oregon
  - INTECOL/SWS combined Meeting, June 3-8, 2012**,** Orlando, FL

- 2011 (Project Announcements)
  - SSSA Div. S-10 (Wetland Soils) meeting in San Antonio. Digital Soil Mapping Working Group, a part of Div. S-5 (Pedology). NE-1038 Multi-State Hatch Meeting, Digitial Mapping Consortium Working Group Meeting, and the S-10 (Wetland Soils) Divisional Business meeting.
  - Wetland Mapping Consortium (WMC) Webinar (July, 2011)
  - 2011 State/Tribal/Federal Wetland Coordination Meeting

Unique Identifiers Workgroup Meeting Schedule

- WMC Scholar Subgroup
- Meetings at Scheduled Outreach Events?
- Conference Calls
  - Wednesdays at 3pm?
  - Biweekly? Weeks 2 and 4?
  - Alternate times?

DISCUSSION

CMI Technical Guidance on Unique Identifiers for Wetlands

For more information please contact:

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