United States Department of Agriculture
Natural Resources Conservation Service
210 Walnut Street
693 Federal Building
Des Moines, IA 50309-2180

October 16, 2001

BIOLOGY TECHNICAL NOTE NO. 24
190-VI - Notice IA1

SUBJECT: ECS - BIOLOGY – SHALLOW WATER EXCAVATON FOR WILDLIFE

Purpose. This Biology Technical Note #24 is intended to provide guidance on the use of Shallow Water Excavation for Wildlife.

Effective Date. When received.

Filing Instructions. File the attached material in the Technical Note Binder - Biology Section. Make pen and ink additions to the Index.

This notice should be destroyed after recording on the Directive Tabulation Sheet in front of the Biology Technical Note Section.

Leroy Brown
State Conservationist

Attachments

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EN2
Biologists
Wetland Restoration Specialists

TECHNICAL NOTES

U. S. DEPARTMENT OF AGRICULTURE **IOWA STATE OFFICE**

NATURAL RESOURCES CONSERVATION SERVICE **DES MOINES, IOWA**

Biology #24

Date: October 16, 2001

Subject: SHALLOW WATER EXCAVATION FOR WILDLIFE

Shallow Water Excavation for Wildlife (SWEW) is being used in restoration of wetlands to better restore/recreate wetland ecosystems. The Iowa Field Office Technical Guide Practice Standard Wetland Restoration (657) provides the criteria for this activity. When determining alternative restoration techniques, always fully consider program and resource goals.

The attached SWEW information is effective immediately for all SWEW activities. It will be incorporated as an Iowa amendment in the National Wetlands Reserve Program Manual and on a statewide standard drawing.

Jim Ayen, State Resource Conservationist, and Mark Jensen, State Conservation Engineer, are providing technical support on this aspect of wetland restoration.

James E. Ayen
State Resource Conservationist

SHALLOW WATER EXCAVATION FOR WILDLIFE (SWEW)
October 2001

The goal for restoration activity is to manipulate hydrology and topography in a way that restores or enhances wetlands to recreate historic wetland ecosystems. Taking time to walk over areas, which have not been manipulated, will indicate where additional pieces of the ecosystem could be sited. Always consider the effects of establishing shallow water areas on existing land use and vegetation. The benefits of constructing shallow water areas may be less than the negative effects of losing existing habitat. The establishment of shallow water areas for wildlife should be used judiciously. They are not required and certainly do not fit every easement.

Following are some considerations when developing restoration alternatives including shallow water excavations for wildlife.

1. When planning SWEW sites, consideration should be given to:
   a. wetland type to be restored;
   b. target wildlife species;
   c. soil type;
   d. cultural resources;
   e. goal for restoration;
   f. hydro periods; and
   g. placement of excavated material, such as,
      ⇨ resting/loafing areas within the shallow water area;
      ⇨ loafing areas outside shallow water area;
      ⇨ creation of irregular bottoms on shallow water areas below projected water levels;
      ⇨ creation of small areas of diverse topography on level sites; and
      ⇨ fill material for small dikes or ditch plugs.

   Consideration should be given to both the positive and negative effects of doing SWEW (scraping, creating loafing areas, and/or spreading of spoil) in the area. These effects are to be measured against the objectives for the site being restored including appropriate program objectives. They should also be compared to other restoration techniques or methods that would create the same conditions.

   See the chart "Preferred Water Depths and Wetland Habitat Preferences of Migratory Birds in Iowa" at the end of this guidance for further information to use in planning shallow water excavation for wildlife.

2. Shallow Water Excavation for Wildlife (SWEW) is not appropriate for every site. Floodplains are most conducive. Locating the old stream channels, oxbows, meanders, and floodplain depressions will target SWEW activity to those acres where soil removal will result in the biggest benefit.

   In pothole soils, SWEW may be used to restore potholes to original surface elevation. The main purpose would be to disturb the soil below the plow layer in order to "release" the buried and suppressed native plant seed bank. Extensive excavation is generally not necessary nor preferred.

3. Tools to use when locating sites for shallow water excavation include:
   a. topographic maps when available
   b. wet year aerial photographs (slides)
   c. walking the site looking for vegetation, soils, and topographic changes;

d. soil survey;
e. historical aerial photography (1930 and 40 vintage); and
f. experience.

4. Contracting for shallow water excavations should be done on a per acre basis. The cost estimate can be based on either estimated cubic yards of excavation or an estimate of the time required by a certain type of equipment at a given unit cost. These estimates can be converted to a cost per acre for use in the CPO.

5. Plan views for construction drawings can generally best be prepared on aerial photos. In many cases, GIS can be used to draw in the boundaries for the shallow wetland excavation areas.

6. Detailed surveys will not be needed on all sites. Total station or GPS surveys may be required on large, flat sites and on some smaller sites with complex features. However, on many sites, other methods of planning/laying out the shallow wetland excavation areas can be accomplished by one of the following methods.

   Use 1993 or other wet year slides to delineate the wet areas. This can be used to develop plan views. The photos can be scanned. From this information, GPS coordinates can be determined. The GPS can then be used to lay out the area in the field.

   The wet area can be flagged in the field by looking at the vegetation or other factors. For example, the wet area may have different types of vegetation; vegetation may be different colored; or vegetation may be a different size than surrounding areas. The flagged area can be measured using GPS equipment. This data can then be used to develop the drawing and also serve as long term documentation of the practice.

7. Soil investigations for SWEW's should be conducted by the ARSS or other qualified personnel. The investigation will identify the depth of post settlement alluvium (PSA) to help ensure that excavation will not cause the site to be drained by breaking through an existing impervious layer if the area is underlain by sands or other coarse material. The investigation will also be used to ensure that cultural resources are not located on the site. If cultural resources are discovered, Richard Rogers, Archeologist, State Office will be contacted to discuss the finding and determine the appropriate action.

8. There is no absolute "maximum" height for dikes. However, a rule of thumb should be that dikes should generally not exceed heights of three to four feet with many being smaller. Higher dikes can be used if needed to meet specific objectives or topographic limitations. (Remember we want shallow water on most of the wetland restoration, not deep water.)

9. Consult the 657 standard for design of SWEW areas. Keep slopes flat, the flatter the better. The standard calls for minimum of 6:1 slopes, with 10:1 or flatter preferred to make it more functional and so the site does not resemble a dugout pond. Keep it mostly shallow, a minimum of two-thirds of any site should be shallower than 18 inches. A good definition of shallow water would be: > 50 percent of basin from 0 to 12 inches deep; 20 to 30 percent, 12 to 24 inches deep; and no more than 5 percent of basin deeper than 36 inches.

PREFERRED WATER DEPTHS AND WETLAND HABITAT PREFERENCES of MIGRATORY BIRDS in IOWA

Bird Species	Water (depth in)	Openings			Vegetative Cover				Foods					Season	
		Open Water	Mud Flats	None	Sparse	Dense	Short	Tall	Verts.	Inverts	Seeds	Tubers	Browse	Migration	Breeding
Tundra Swan	10+	**			**		**			**	**	**		**	**
Snow Goose	0-4	**	**		**		**					**	**	**	
Canada Goose	0-4	**	**		**		**				**	**	**	**	**
Wood Duck	2-10	**			**		**	**		**	**			**	**
Green Wing Teal	2-10	**	**		**		**	**		**	**	**		**	**
Mallard	2-6	**	**		**		**			**	**	**		**	**
N. Pintail	2-10	**	**		**		**	**		**	**	**		**	**
Blue Winged Teal	2-10	**	**		**		**	**		**	**	**		**	**
N. Shoveler	2-10	**			**		**			**	**		**	**	**
Gadwall	2-10	**			**		**			**	**		**	**	**
Am. Widgeon	10+	**		**	**		**	**		**	**	**	**	**	
Canvasback	10+	**		**	**		**	**		**	**			**	
Redhead	10+	**			**		**	**		**	**	**		**	**
Ring-necked Duck	10+			**	**		**	**		**	**	**		**	**
Lesser Scaup	10+	**		**	**		**			**				**	
Goldeneye	10+	**		**	**				**	**				**	
Bufflehead	2-10+	**		**	**		**		**	**				**	
Hooded Merganser	10+	**		**	**		**		**	**				**	**
Common Merganser	10+	**		**	**		**	**	**	**				**	
Ruddy Duck	10+	**			**		**	**		**			**	**	**
Yellow Rail	0-2					**		**		**	**			**	
King Rail	0-4	**	**			**		**		**				**	**
Virginia Rail	0-4	**				**		**		**				**	
Sora	0-10	**				**		**		**	**			**	**
Common Moorhen	8+	**			**	**	**	**		**			**	**	**
Am. Coot	8+	**			**	**	**	**		**				**	**
Blk Bellied Plover	0		**	**	**		**			**					**
Golden Plover	0		**	**	**		**			**					**
Killdeer	0		**	**	**		**			**				**	**
Lesser Yellowlegs	0-2	**		**	**		**			**				**	
Solitary Sandpiper	0-2	**	**		**		**			**				**	
Willet	0-2	**	**	**	**			**		**				**	
Spotted Sandpiper	0		**	**	**			**		**				**	**

PREFERRED WATER DEPTHS AND WETLAND HABITAT PREFERENCES of MIGRATORY BIRDS in IOWA

Bird Species	Water (depth in)	Openings			Vegetative Cover				Foods					Season	
		Open Water	Mud Flats	None	Sparse	Dense	Short	Tall	Verts.	Inverts	Seeds	Tubers	Browse	Migration	Breeding
Upland Sandpiper	0		**		**		**			**				**	**
Semipalmated Sandpiper	0		**	**	**		**			**				**	
Least Sandpiper	0		**	**	**		**			**				**	
White-Rumped Sandpiper	0	**	**		**		**			**				**	
Pectoral Sandpiper	0-1	**	**	**	**		**			**				**	
Dunlin	0	**			**		**			**				**	
Stilt Sandpiper	1-4	**		**	**		**			**				**	
Common Snipe	0-1	**	**	**	**	**	**	**		**				**	**
Am. Woodcock	0		**			**	**	**		**				**	**
Wilson Phalarope	2-10+	**		**	**		**			**				**	
Pied-billed Grebe	10+	**		**	**		**		**	**				**	**
Am. Bittern	0-4					**	**	**	**	**				**	**
Least Bittern	0-18	**				**		**	**	**				**	**
Black-crowned Night Heron	0-16	**		**	**		**		**	**				**	**
Little Blue Heron	0-8	**		**	**		**		**	**					**
Green-backed Heron	0-8	**	**	**	**		**		**	**				**	**
Great Blue Heron	0-24	**		**	**		**		**	**				**	**
Great Egret	0-18	**		**	**		**		**	**				**	**
Snowy Egret	0-8	**		**	**		**		**	**				**	
Red-winged Blackbird	0-10+				**	**	**	**		**	**			**	**
Yellow-headed Blackbird	0-20+				**	**	**	**		**	**			**	**
Sedge Wren	0					**		**		**				**	**
Marsh Wren	0					**		**		**				**	**

COMMENTS ON GUIDE;

Water Depth is the range of water depth that the species prefers for feeding and cover. Some species such as waterfowl may spend portions of their cycle on land (nesting) and other portions on deep water (molting, staging, etc.).

A ** symbol under a column in the table indicates the species uses that habitat type sometime in their life cycle.

Under season, a species that only migrates through the state during spring and fall migration is only marked under migration column. A species may be both a migrant and breeding resident species if both columns are marked.