Restoring and creating wetlands
• Creation: turning an upland or deep area into a wetland

• Restoration:
  – re-creating a wetland that previously existed; or,
  – enhancing recovery of a degraded wetland
How to restore/create

- Location, location, location
- Basin
- Hydrology
- Soils (& residual toxins, fertilizers)
- Vegetation (seed source)
- Fertilizer?
- Animals?
- Buffer?

**Goal:**
It should take care of itself and not require repeated human intervention to remain a wetland of the appropriate type.
Location
Conservation Reserve Program
Restoration of farmed wetlands
Saginaw Bay coastal wetlands

- Typical FWS restoration activities on 1300 acres of coastal wetland or lakeplain prairie:
  - breach dike by bay and raise dikes by neighbors
  - fill ditch adjacent to dike
  - enhance site topography for habitat benefits
  - remove pumps and disconnect drains
  - establish native vegetation in upland area
  - demolish structures and remove utility poles
EAST BERM
Middle of East Berm looking South.

April 10, 2001

Site Badour 2 on SW side of Saginaw Bay

Before

EAST BERM
North End of East Berm looking South.

June 4, 2002

After
Hydrograph of Bay 93. The drainage ditch was closed in October, 1994.

Figure 53. The relative position of a basin substrate, the water table, and differences in vegetation resulting from the degree of basin slope.

http://www.uga.edu/srel/ESSite/CBWWetland_restoration.htm
Vegetation: remove upland veg, plant wetland veg?

Herbaceous Species Richness by Treatment and Year

Species Richness
Cut and Burned Treatment

Wetland Plants
- Obligate Wetland
- Facilitative Wetland

Non-Wetland Plants
- Facilitative Upland
- Upland
- Facilitative

http://www.uga.edu/srel/ESSite/CBWWetland_restoration.htm
Restoring peatlands

http://www.fes.uwaterloo.ca/u/jsprice/price/JSP/Peatland%20Restoration.htm
Preparing former wetland

Field preparation
Collecting organic material from donor wetland

Donor material collection
Spread donor material on restoration area
Apply hay mulch

Mulch application
### 1998, 1999, and 2000 Percent Cover

**Planting Time/Mulch/Companion Species Study**

**Michigan Peat Study Site**

*(Mean + standard deviation, n = 6)*

<table>
<thead>
<tr>
<th>Planting Time</th>
<th>Mulch</th>
<th>Carex</th>
<th>No-Carex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>Mulch</td>
<td>1998</td>
<td>1999</td>
</tr>
<tr>
<td></td>
<td>No-Mulch</td>
<td>1998</td>
<td>1999</td>
</tr>
<tr>
<td>Spring</td>
<td>Mulch</td>
<td>1998</td>
<td>1999</td>
</tr>
<tr>
<td></td>
<td>No-Mulch</td>
<td>1998</td>
<td>1999</td>
</tr>
</tbody>
</table>

**Species Representation**:
- **Sphagnum**
- **Other Mosses**
- **Vascular Plants**

**Legend**:
- Green: Sphagnum
- Yellow: Other Mosses
- Red: Vascular Plants
Restoring swamps
Restoring floodplain wetlands

Fig. 1.10a -- The three major components of a stream corridor in different settings. In Stream Corridor Restoration: Principles, Processes, and Practices, 10/98 by the Federal Interagency Stream Restoration Working Group (15 Federal Agencies of the US)
Restoring tidal wetlands

Delaware estuary enhancement

- 20,000 ha (32 sq miles)
- Restore areas diked for salt hay, invaded by Phragmites, & degraded by other impacts

(http://www.pseg.com/environment/estuary/overview.jsp)
Commercial Twp Site - 1996

4000 ha
Diked for salt hay
Restoring Louisiana Delta wetlands

http://www.lacoast.gov/projects/list.asp
Restoring Louisiana Delta wetlands

http://www.lacoast.gov/projects/list.asp
Did it work?

Is it, or will it become, a natural self-sustaining system of the appropriate wetland type?
Success: hydrology

- Excess open water the most common cause of failure
Success: soils
Success: vegetation
Success: animals

Craft and Sacco 2003
Success: functions

a. Physical processes related to hydrology (sedimentation, soil C and N accumulation)
b. Primary production, biological processes strongly linked to primary production (decomposition, benthic invertebrates)
c. Wetland soil development

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Craft et al. 2003