

# Existing Waste Storage Pond Evaluation Procedure and NRCS/WSDA CTA Agreement

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## Presentation Goals

1. Provide an Overview of the DRAFT Existing Waste Storage Pond Evaluation Procedure,
2. Provide an Overview of the NRCS/WSDA CTA Agreement,
3. Provide clarification as requested so that the STAC has a clear understating of the topics and their interrelationship.

# Existing Waste Storage Pond Evaluation Procedure

## Background

1. NRCS routinely works with dairy operations that have existing Waste Storage Ponds (WSP's).
  - Currently no procedures for assessing performance of existing WSP's,
  - Currently no policy on how to account for existing WSP's as part of a Waste Management System,
  - Currently no policy for NRCS cost share of practices associated with existing WSP's.

# Existing Waste Storage Pond Evaluation Procedure

## Background

2. NRCS experienced a failure of a large existing WSP.
  - Engineering investigation raised questions about the siting of WSP's,
  - There is a higher level of public scrutiny than has been experienced in the past,
  - Multiple FOIA requests for information on Dairies.

# Existing Waste Storage Pond Evaluation Procedure

## Background

3. NRCS desires assurance that cost shared practices protect water resources.
  - NRCS will be able to set funding priorities based on a “Risk Assessment”,
  - As deemed necessary, outline an approach for rehabilitating or decommissioning existing WSP’s,

# Existing Waste Storage Pond Evaluation Procedure

## TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE

ENGINEERING #DRAFT

SPOKANE, WASHINGTON  
September 2011

DRAFT

### EXISTING WASTE STORAGE POND (WSP) REVIEW PROCEDURE

An evaluation procedure for assessing the structural integrity  
and  
Groundwater contamination risk of an existing earthen waste  
storage pond structure



# Existing Waste Storage Pond Evaluation Procedure

## Objectives

To implement a technically defensible consistent approach for completing a qualitative assessment of existing WSP's for:

- ✓ Structural Soundness.
- ✓ Water Resource Risk.
- ✓ Overall WSP risk assessment indicating the probability of surface or ground water degradation.

# Existing Waste Storage Pond Evaluation Procedure

## Objectives

The procedure does not require:

- ✓ Laboratory test data for assessing embankment or compacted earthfill liner soils.
- ✓ Laboratory test data of surface or groundwater contamination.

# Existing Waste Storage Pond Evaluation Procedure

## Structure Assessment

Requires two assessments:

1. WSP Full
2. WSP Empty

**EXISTING WASTE STORAGE POND  
STRUCTURAL INTEGRITY REVIEW FORMS**

**A. Site inventory – when WSP is FULL (Typically late winter or early spring)**

LANDOWNER/FARM NAME: \_\_\_\_\_

WASTE STORAGE POND SITE LEGAL LOCATION: Sec \_\_\_\_\_ T \_\_\_\_\_ R \_\_\_\_\_

REVIEW INVENTORY DATE: \_\_\_\_\_

MANURE/ EFFLUENT LEVEL and Other Observations: \_\_\_\_\_

\_\_\_\_\_

TODAY: Liquid Level BELOW Top of Embankment or Spillway Elevation: \_\_\_\_\_ FT

Complete inventory questions appropriate to structure, if no embankment, as in a pit pond, show NA.

<b>EARTHEN STRUCTURAL INTEGRITY</b>			
<small>If any boxes checked "YES"; make notes of extent of damage and identify options to repair or stabilize in <b>REPORT</b> section.</small>			
SITE INVENTORY QUESTION	YES	NO	NA
1. Interior erosion observed?			
a. Due to wave action?			
b. In vicinity of the waste inlet structure?			
c. Due to erosion from rainfall?			
d. Near agitation equipment access points?			
2. Signs of embankment damage?			
a. Due to burrowing animals?			
b. Presence of trees or woody vegetation?			
c. Presence of large weeds?			
d. Evidence of overtopping or soil erosion of embankment?			
e. Damp, soft, or slumping areas on berm?			
f. Seepage near bottom of berm slope?			
g. Seepage around pipes thru berm?			

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# Existing Waste Storage Pond Evaluation Procedure

## Structure Assessment

### Inventory Data (Earthen Structure)

1. Is there Embankment or Liner erosion?
2. Pond constructed with a liner?
3. Signs of embankment damage?

**EXISTING WASTE STORAGE POND  
STRUCTURAL INTEGRITY REVIEW FORMS**

**A. Site inventory – when WSP is FULL (Typically late winter or early spring)**

LANDOWNER/FARM NAME: \_\_\_\_\_

WASTE STORAGE POND SITE LEGAL LOCATION: Sec \_\_\_\_\_ T \_\_\_\_\_ R \_\_\_\_\_

REVIEW INVENTORY DATE: \_\_\_\_\_

MANURE/ EFFLUENT LEVEL and Other Observations: \_\_\_\_\_

\_\_\_\_\_

TODAY: Liquid Level BELOW Top of Embankment or Spillway Elevation: \_\_\_\_\_ FT

Complete inventory questions appropriate to structure, if no embankment, as in a pit pond, show NA.

EARTHEN STRUCTURAL INTEGRITY			
<small>If any boxes checked "YES"; make notes of extent of damage and identify options to repair or stabilize in REPORT section.</small>			
SITE INVENTORY QUESTION	YES	NO	NA
1. Interior erosion observed?			
a. Due to wave action?			
b. In vicinity of the waste inlet structure?			
c. Due to erosion from rainfall?			
d. Near agitation equipment access points?			
2. Signs of embankment damage?			
a. Due to burrowing animals?			
b. Presence of trees or woody vegetation?			
c. Presence of large weeds?			
d. Evidence of overtopping or soil erosion of embankment?			
e. Damp, soft, or slumping areas on berm?			
f. Seepage near bottom of berm slope?			
g. Seepage around pipes thru berm?			

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# Existing Waste Storage Pond Evaluation Procedure

## Structure Assessment

### Inventory Data (O&M)

OPERATION AND MAINTENANCE			
If any boxes checked "NO"; make notes of location and identify O & M task to improve management in REPORT section.			
SITE INVENTORY QUESTION	YES	NO	NA
1. Is liquid level marker available and visible?			
2. Are manure pump and transfer pipes functioning?			
3. Are recycling pumps and transfer pipes functioning?			
<b>CLEAN WATER DIVERSION</b>			
4. Perimeter drains plugged or blocked?			
5. Roof water or clean runoff entering storage?			
6. Diversions/waterways maintained?			
<b>VISUAL APPEARANCE AND SAFETY</b>			
7. Site neat and recently mowed?			
8. Waste storage pond access fenced and properly marked?			
<b>O &amp; M ITEMS FOR ODOR AND AIR QUALITY</b>			
9. Crust of solids on lagoon?			
10. Solids managed to <u>prevent</u> plants growing on crust?			
11. Anaerobic lagoon is purple/pink?			
12. Actively bubbling?			
13. Inlet pipes submerged?			
14. Downwind odor from WSP is: <u>None</u> <u>Faint</u> <u>Distinct</u> <u>Strong</u> <u>Unbearable</u>			
Part B of inventory documentation completed by: _____ Agency _____ (print name)			
<b>COMMENTS:</b>			

1. Are pumps and appurtenances functioning?
2. Are clean water diversions functioning?
3. Appearance and Safety measures maintained?
4. Odor and air quality issues?

# Existing Waste Storage Pond Evaluation Procedure

## Structure Assessment

### Inventory Data (Current Condition)

1. Estimated Storage Capacity
2. Physical Measurements
3. Pond depth
4. Liner type
5. Inlet condition
6. Access ramp condition
7. Pump/Agitation site condition

**EXISTING WASTE STORAGE POND  
STRUCTURAL INTEGRITY REVIEW FORMS**

**C. Summarize inventory for structural integrity evaluation**  
Complete the information below based on the original construction plans and current site inventory and existing site survey data collected.

LANDOWNER/FARM NAME: \_\_\_\_\_  
WASTE STORAGE POND SITE LEGAL LOCATION: Sec \_\_\_\_\_ T \_\_\_\_\_ R \_\_\_\_\_  
ORIGINAL WASTE STORAGE POND DESIGNER: \_\_\_\_\_ DATE: \_\_\_\_\_  
DATE ORIGINAL WASTE STORAGE POND COMPLETED: \_\_\_\_\_  
REQUIRED - FREEBOARD FOR STORM VOLUME or DEPTH\* \_\_\_\_\_ GAL or FT

\*Depth as listed in design data to store runoff from a 25-YR/24-HR storm event,  
(WA 25-YR 24-HR Isopluvial map online at: <http://www.nrcs.usda.gov/wps/pubs/nrcs20y24h.gif>)  
Or available storm water storage below top of embankment or spillway elevation.

DEPTH TO SEASONAL HIGH GROUND WATER TABLE (SHGW) BELOW (original or best estimate from inventory) NATURAL GROUND: \_\_\_\_\_

LIST THE DESIGN CRITERIA:	ORIGINAL DESIGN CONDITIONS Released data	CURRENT CONDITIONS	NRCS design criteria at time of installation or last modification <sup>1</sup>
1. Storage capacity at overflow, or crest elevation if no spillway.			
2. Footprint - inside top - LENGTH			
3. Footprint - inside top - WIDTH			
4. Embankment - Inside SS			
5. Embankment - Outside SS			
6. Embankment - Top Width			
7. Embankment - Maximum Fill Height			
8. Maximum Excavation Depth			
9. Total POND Depth			
10. Liner type or soil amendment condition			
11. Inlet type location and condition			
12. Outlet ramp condition			
13. Pump/agitation site condition			

<sup>1</sup> Appendix 2: Lists the relevant NRCS practice standard design criteria by date of adoption for current and archived NRCS practice standards used for Waste Storage Pond design and construction in Washington State.

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# Existing Waste Storage Pond Evaluation Procedure

## Structure Assessment

### Assessment Baseline

Comparative assessment to the NRCS practice standard in place at the time construction was completed.

**EXISTING WASTE STORAGE POND  
STRUCTURAL INTEGRITY REVIEW FORMS**

**C. Summarize inventory for structural integrity evaluation**  
Complete the information below based on the original construction plans and current site inventory and existing site survey data collected.

LANDOWNER/FARM NAME: \_\_\_\_\_  
 WASTE STORAGE POND SITE LEGAL LOCATION: Sec \_\_\_\_\_ T \_\_\_\_\_ R \_\_\_\_\_  
 ORIGINAL WASTE STORAGE POND DESIGNER: \_\_\_\_\_ DATE: \_\_\_\_\_  
 DATE ORIGINAL WASTE STORAGE POND COMPLETED: \_\_\_\_\_  
 REQUIRED - FREEBOARD FOR STORM VOLUME or DEPTH\* \_\_\_\_\_ GAL or FT

\*Depth as listed in design data to store runoff from a 25-YR/24-HR storm event,  
 (WA 25-YR 24-HR Isopluvial map online at: <http://www.nrcs.usda.nps.gov/wa25y24h.gif>)  
 Or available storm water storage below top of embankment or spillway elevation.  
 DEPTH TO SEASONAL HIGH GROUND WATER TABLE (SHGWT) BELOW (original or best estimate from inventory) NATURAL GROUND \_\_\_\_\_

LIST THE DESIGN CRITERIA:	ORIGINAL DESIGN CONDITIONS Released data	CURRENT CONDITIONS	NRCS design criteria at time of installation or last modification <sup>1</sup>
1. Storage capacity at overflow, or crest elevation if no spillway.			
2. Footprint - inside top - LENGTH			
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4. Embankment - Inside SS			
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9. Total POND Depth			
10. Liner type or soil amendment condition			
11. Inlet type location and condition			
12. Outlet ramp condition			
13. Pump/agitation site condition			

<sup>1</sup> Appendix 2: Lists the relevant NRCS practice standard design criteria by date of adoption for current and archived NRCS practice standards used for Waste Storage Pond design and construction in Washington State.

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# Existing Waste Storage Pond Evaluation Procedure Structure Assessment

## Assessment Baseline

Highlights of the archived NRCS Practice Standard 313, Waste Storage Facility.

All NRCS Standards have criteria for addressing seepage and constructing above the SHGWT.

Standard Adoption Dates	Separation Distance in Feet From . . .	Seasonal High Groundwater Table: Separation Distance From Pond Bottom	Liner Criteria: Soil type, Compaction, Permeability
1979, April PS-425	Not specified	Do not construct to an elevation below the SHGWT unless considered a special design	Soils of slow to moderate permeability. Avoid gravel and shallow soils. If self-sealing is not probable, the storage pond shall be sealed by mechanical treatment or by the use of an impervious membrane.
1987, February PS-425	300 ft from a neighboring residence, 200 ft from domestic well in an unconfined aquifer and 25 ft from water courses. All measured from outside toe of fill or top edge of pit pond.	The operation and maintenance plan shall specify that the liquid level in the pond be maintained at least 1-in. above the ground water	No liner required for dense glacial till soils. GM, SM and ML materials may be used for a 12-in compact liner. GC and SC materials may be used for a 6-in compacted liner. CL and CH materials may be used for a 6-in compacted liner
1994, January PS-425	300 ft from any existing water wells unless aquifer evaluated for reduced distance	Do not construct below the SHGWT and shall have a properly designed and installed liner	1-ft minimum thickness, compacted soil liner of acceptable USCS soil material identified and listed as: CH, CL, MH, ML and SM, SC, GM, GC if they contain more than 20% fines (passing #200 sieve)
2000, February PS-313	300 ft from any existing water wells unless aquifer evaluated for reduced distance	Pond bottom elevation shall be a minimum of 2 ft above SHGWT. Depth to SHGWT shall be determined from soil features with the assistance of a soil scientist or from monitoring wells.	1-ft minimum thickness, compacted soil liner of acceptable USCS soil material identified and listed as: CH, CL, MH, ML and SM, SC, GM, GC if they contain more than 20% fines (passing #200 sieve)
2001, June PS-313	300 ft from any existing water wells for storage pond unless aquifer evaluated for reduced distance.	Pond Bottom, Minimum 2 ft above SHGWT. SHGWT may be lowered by perimeter drains if feasible. Engineering Tech Note #7 (formerly agronomy Tech Note #42) shall be used to identify soil features for establishing the SHGWT.	Foundation permeability cannot exceed $1 \times 10^{-6}$ cm/s or it must be lined. All soil liners shall have a minimum compacted thickness of 1-ft. Compacted soil liner permeability must be equal to or less than $1 \times 10^{-6}$ cm/s.
2004, December PS-313	100 ft from any existing water wells. Aquifer evaluation required for variance but must meet state and local regulations.	Pond Bottom, Minimum 2 ft above SHGWT. SHGWT may be lowered by perimeter drains if feasible and buoyant forces are considered.	1-ft minimum thickness of compacted soil liner. Permeability not to exceed $1 \times 10^{-6}$ cm/s

# Existing Waste Storage Pond Evaluation Procedure

## Structure Assessment

### Assessment Report

**EXISTING WASTE STORAGE POND  
STRUCTURAL INTEGRITY REVIEW FORMS**

**REPORT:** Results should reflect flow charts procedure for Case 1 and Case 2

LANDOWNER/FARM NAME: \_\_\_\_\_

WASTE STORAGE POND SITE LEGAL LOCATION: Sec \_\_\_\_\_ T \_\_\_ R \_\_\_

1. DOES IT APPEAR THAT THE WSP WAS DESIGNED BY NRCS OR MET THE NRCS DESIGN CRITERIA IN PLACE AT THE TIME IT WAS INSTALLED OR LAST MODIFIED?  
\_\_\_ YES \_\_\_ NO

2. DOES THE WSP, AS IT EXISTS, APPEAR TO HAVE STRUCTURAL INTEGRITY?  
\_\_\_ YES \_\_\_ NO

3. IF THE WSP MET THE NRCS PRACTICE STANDARD, WAS IT BUILT WITH A LINER?  
\_\_\_ YES \_\_\_ NO

4. IF THE WSP DOES NOT APPEAR TO BE STRUCTURALLY STABLE, DESCRIBE BELOW THE RECOMMENDED ACTION IS TO STABILIZE THE WSP STRUCTURE.

**OPERATION AND MAINTENANCE:**

REPAIR': \_\_\_\_\_

\* REHABILITATE': \_\_\_\_\_

\* REPLACE': \_\_\_\_\_

\* Permit required from WA Dam Safety if WSP stores more than 10-acre feet of liquids at crest.

\* If recommended action is to REHABILITATE or REPLACE waste storage pond, it must be built to current NRCS design criteria. Seepage potential will then be restricted to prevent groundwater degradation with "all known available and reasonable methods" (AKART).

Structural Assessment Report Completed by: \_\_\_\_\_ Date: \_\_\_\_\_

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1. Does the WSP meet NRCS standards in place at the time of Construction?
2. Does the WSP have structural integrity?
3. If work is needed then either...
  - Repair
  - Rehabilitate
  - Replace

# Existing Waste Storage Pond Evaluation Procedure

## Water Resource Risk Assessment

### Risk Factors:

1. Depth to ground water for water supply wells,
2. Distance to surface water with 303(d) listing,
3. Located within the GWMA,
4. Add - Nitrate Vulnerability Index?

#### EXISTING WASTE STORAGE POND

##### STRUCTURAL INTEGRITY REVIEW FORMS

**Site Ground Water Resource Risk:** This risk factor is based on the existing WSP site location, depth to groundwater, proximity to other groundwater users and locally identified water quality resources concerns.

Circle the risk level that applies and check the particular site location conditions that apply.

**Low Risk:** Located in an area that is highly unlikely to have groundwater affected by seepage and, at least three of the four low risk characteristics and no more than one of the high risk characteristics may apply:

- No shallow, < 145 feet deep, groundwater water supply wells within 100 feet of the nearest edge of the WSP.
- Not located at a site where the seasonal high ground water table is closer than 2 feet to the bottom of the pond.
- Not located at a site where the soils engineering properties below the 30 inch depth as identified in the Web Soil Survey (WSS) as those found in Group I in AWMFH, Table 10D-3 and Table 10D-4 and the WSP is constructed without an engineered liner.
- Not located in an area where the Nitrate Vulnerability for wells, up to 145 feet deep, is >50% probability that nitrate concentration will exceed 2 mg/L (or 2 ppm).

**Medium Risk:** Located in an area that may have groundwater that could be affected by seepage.

- Meet at least two of the four low risk characteristic listed above, and has location properties that meet no more than two high risk characteristic listed below.

**High Risk:** Located in an area that uses groundwater as a significant water resource and is highly vulnerable to contamination. Meets three or more of the high risk conditions

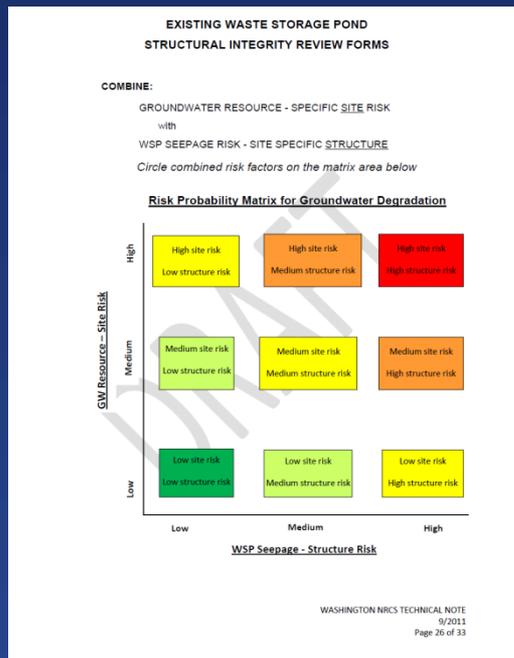
- Shallow < 145 feet deep, groundwater water supply wells within 100 feet of the nearest edge of the WSP.
- Located at a site where the seasonal high ground water table is closer than 2 feet to the bottom of the pond.
- Located at a site where the soils engineering properties below the 30 inch depth as identified in the Web Soil Survey (WSS) as those found in Group I in AWMFH, Table 10D-3 and Table 10D-4 and the WSP is constructed without an engineered liner.
- Located in an area where the Nitrate Vulnerability for wells, up to 145 feet deep, is >50% probability that nitrate concentration will exceed 2 mg/L (or 2 ppm).

# Existing Waste Storage Pond Evaluation Procedure

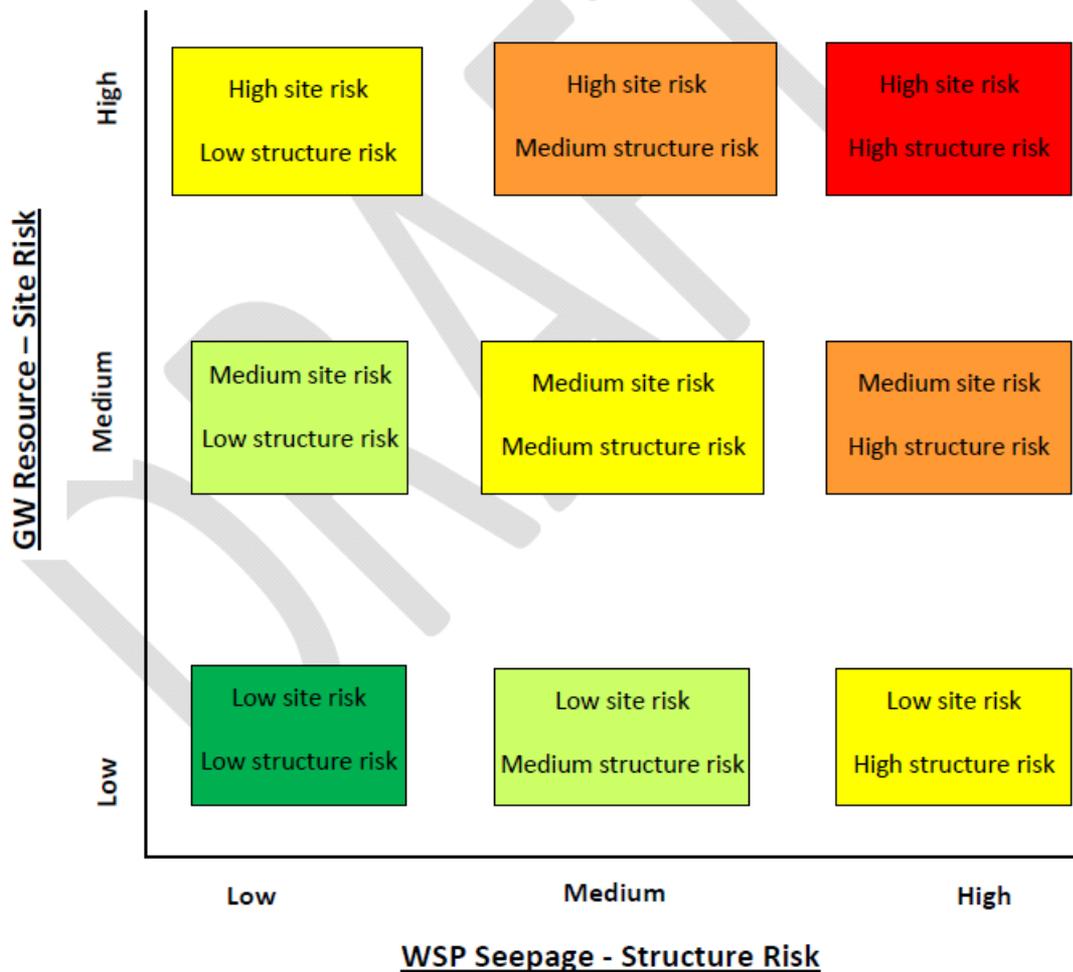
## Structure Risk Assessment

### Risk Factors:

1. Ground Water Resources
2. Structural Integrity



### Risk Probability Matrix for Groundwater Degradation



# Existing Waste Storage Pond Evaluation Procedure

## Structure Risk Assessment

## Risk Assessment Recommendations

# Existing Waste Storage Pond Evaluation Procedure

## Structure Risk Assessment

If:

Medium site risk  
Low structure risk

OR

Low site risk  
Low structure risk

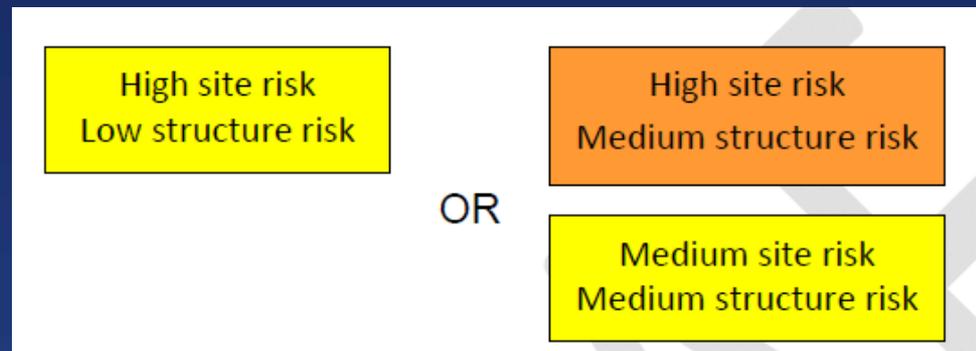
Low site risk  
Medium structure risk

Then: The evaluation finds that the WSP will function for the purposes of waste storage as designed and will protect water quality resources.

# Existing Waste Storage Pond Evaluation Procedure

## Structure Risk Assessment

If:

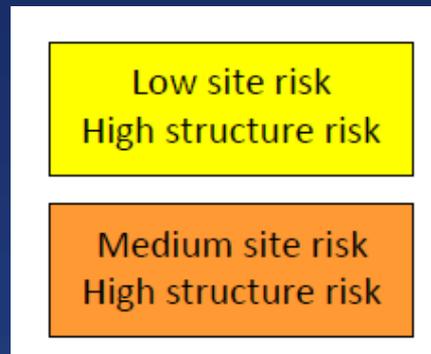


Then: There are site concerns and possible structural improvements needed. NRCS recommends repairing and improving the waste storage pond structure.

# Existing Waste Storage Pond Evaluation Procedure

## Structure Risk Assessment

If:



Then: NRCS recommends rehabilitation or replacement of the existing WSP.

# Existing Waste Storage Pond Evaluation Procedure

## Structure Risk Assessment

If:

High site risk  
High structure risk

Then: NRCS recommends replacement of the existing WSP.

Questions?

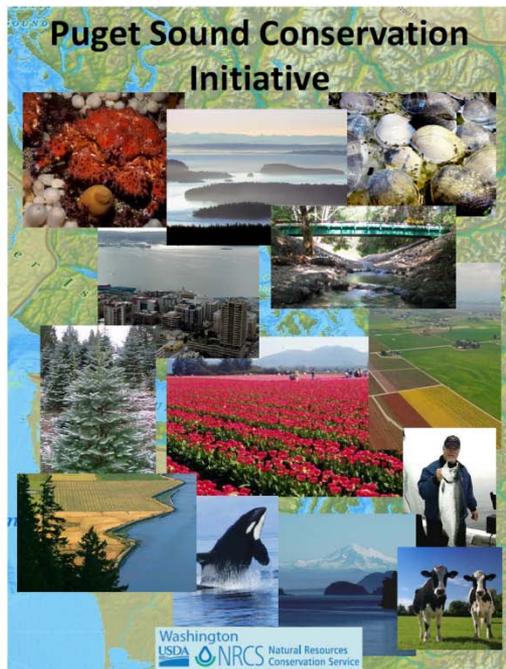
# NRCS Puget Sound Initiative

## Background

**Expected resource based positive outcomes would include:**

- **Habitat Outcome:**

Improved habitat for target species through use of buffers along streams, removal of fish passage blockages, and improvements to water quality



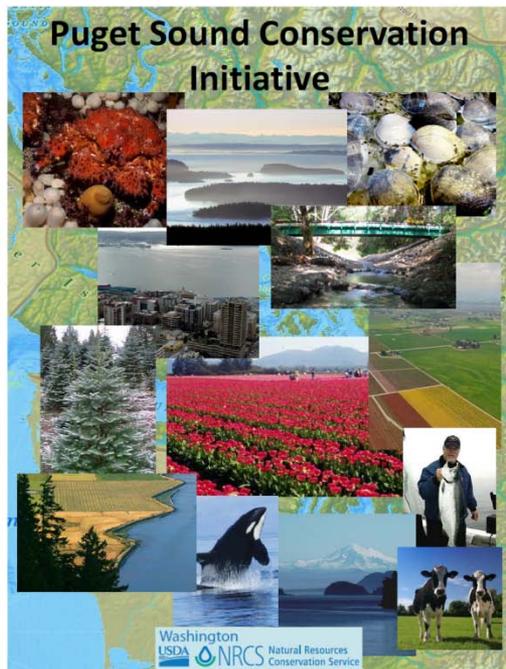
# NRCS Puget Sound Initiative

## Background

**Expected resource based positive outcomes would include:**

- **Air Quality Outcome:**

Improved air quality through reduced on-farm diesel emissions ..., improved agricultural waste facilities, utilization of manure application methods which limit volatilization of nitrogen compounds, and application of comprehensive nutrient management plans.

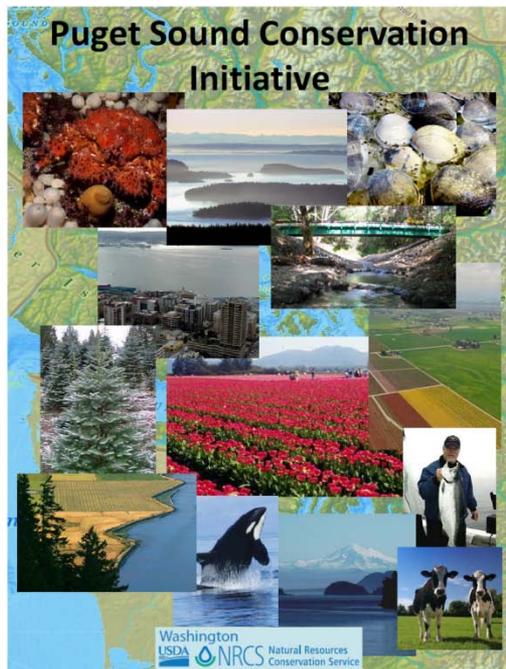


# NRCS Puget Sound Initiative

## Background

**Expected resource based positive outcomes would include:**

- **Water Quality Outcome:**  
Improved water quality through buffers along streams on livestock operations, forest road sediment control, **removal of structurally unsound waste storage lagoons**, and installation of small waste storage facilities for livestock operations.



# NRCS Puget Sound Initiative

## Background

**Existing WSP issue:**

**NRCS Goals...**

1. Establish a prioritization for funding the “Highest Risk” WSP’s to water resources.
2. Provide a targeted approach toward Farm Bill fund allocations to address this resource concern.

# NRCS/WSDA CTA Agreement

## Background

### **NRCS/WSDA Partnership Opportunity:**

1. Standardized process for inventorying WSP's,
2. Leverage activities to avoid the duplication of effort,
3. Peer review of the NRCS Technical Note,

# **NRCS/WSDA CTA Agreement**

## **Agreement**

### **NRCS/WSDA Contribution Agreement:**

1. Signed August 31, 2011
2. Expires December 31, 2012

# NRCS/WSDA CTA Agreement

## Objectives

1. Finalize the NRCS Technical Note “Existing Waste Storage Pond (WSP) Evaluation Procedure”,
2. Assemble comprehensive list of WSP structures in the Puget Sound Basin,
3. Inventory the WSPs in the Puget Sound Basin utilizing NRCS inventory forms,
4. Identify existing WSPs that are no longer in use and are candidates for decommissioning,

# NRCS/WSDA CTA Agreement

## Objectives

5. Build a GIS database layer with an associated attribute table from this existing WSP inventory,
6. Modify and make available to NRCS the existing database used by WSDA to run statewide aquifer vulnerability model.

# NRCS/WSDA CTA Agreement

## Dairy Industry Sensitivity

- ❖ NRCS will be developing technical and program policy based on the “Risk Assessment”,
- ❖ NRCS will be using information for making funding priority decisions,
- ❖ NRCS will be conducting the risk assessment as outlined in the NRCS Engineering Technical Note,
- ❖ NRCS will maintain control of the results of all site specific assessments.

Questions?