Farmed Smart Update
Kay Meyer, Executive Director
1/11/16
• Farmed Smart Update
• Tools and standards used to determine certification ratings
• Certification Progress to Date
• Regulatory Support
• Marketing and Implementation Plans
• PNW Feedback on FS Marketing Plan
• Conference/Partnership Update
Major Initiative

- Development of Farmed SMART Sustainable Agriculture certification program
For farmers

- Add value to farms and commodities they grow
- Increase market availability
- Provide regulatory certainty they are meeting water quality standards
- Protect waterways while keeping working lands working
- Provide advocacy on sustainable ag practices and stewardship of certified farms to environmental and government agencies and consumers
Farmed Smart will

For regulatory & environmental groups

• Protect water ways through voluntary adoption of riparian buffers and farming practices that improve water quality

• Develop collaborative partnerships with farmers that will obtain more results than a regulatory approach

• Provide quantifiable data on reduction of
  o Soil erosion and non-point pollution to waterways
  o Carbon footprint & diesel usage
  o Impact to global warming and greenhouse gas emissions
For consumers

• Educate consumers on the sustainable ag practices being used on certified farmers and their benefits to the environment
• Ensure a safe food supply is being offered in the market
• Debunk farming myths
• Connect communities with the family farm of the 21st century
For PNDSA

• Support the mission our association
• Transition more farmers to a direct seed cropping system
• Recognize & differentiate direct seed producers by adding value to their crops and farms.
What’s in a name....

Consumer-focused

Provides immediate explanation of service

Easy brand recognition

Defines high standards in simple terms

Ability to be used on packaging
What’s in a name...

• Not every student will graduate with honors

• Not every athlete will be an Ironman

• Not every farmer will be Farmed Smart

• These designations are given to those that have achieved these high standards for their level of effort and a goal for others to work towards
Direct Seed Acres in PNW

Washington
Direct Seed Acres
2,213,760, 56%
1,713,151, 44%

Idaho
Direct Seed Acres
1,013,883, 38%
1,676,067, 62%

Oregon
Direct Seed Acres
1,250,830, 64%
706,435, 36%

In 2012, Average Direct Seed Acres in PNW 53%
Direct Seed Acres = Conservation and No-Till Practices
Based on 2012 Census of Agriculture, National Ag Statistics Service
Tools for Farmed Smart

• Defendable, Quantifiable, and Credible tools and models used to determine certification ratings
  o RUSLE2
  o Stream Order Model
  o Crop Energy Estimation
  o Standardized IPM and Nutrient Management Plan Templates
  o Certification Report

• Provided to Farmers to improve their operation through modeling
• Revised Universal Soil Loss Equation, Version 2

• Developed by USDA-Agricultural Research Service (ARS)

• Predicts rill and interrill erosion (sedimentation delivery) by rainfall and runoff, defines **Soil Tillage Intensity Rating** and **Soil Conditioning Index**

• Inputs include soil type, slope of ground, annual precipitation rates, field preparation and seeding operations & equipment, crop rotation and residue management
• 3000 acres, Almira WA
• Soil Tillage Intensity Rating 11
  o Acceptable range for Farmed Smart certification is 0 - 30.
  o In comparison at typical STIR for conventional system 80 - 120
• Soil Conditioning Index
  o A cropping system with diverse crop rotations and cover crops, low disturbance, and high residue is building SOM and will have a positive SCI.

CROP INTERVAL EROSION:

<table>
<thead>
<tr>
<th>Crop year</th>
<th>Start date</th>
<th>End date</th>
<th>Crop</th>
<th>STIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/2/1</td>
<td>8/1/1</td>
<td>vegetations\Wheat, winter, CMZ 50 lo ppt, 16-18 in. spac. early plant</td>
<td>11</td>
</tr>
<tr>
<td>2</td>
<td>8/2/1</td>
<td>8/1/2</td>
<td>vegetations\Barley, spring, CMZ 50, 7 in. spac.</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>8/2/2</td>
<td>8/1/4</td>
<td>vegetations\Wheat, winter, CMZ 50 lo ppt, 16-18 in. spac. early plant</td>
<td>11</td>
</tr>
<tr>
<td>4</td>
<td>8/2/4</td>
<td>8/1/5</td>
<td>vegetations\Wheat, spring, CMZ 50, 7-10 in. spac.</td>
<td>11</td>
</tr>
</tbody>
</table>

SCI and STIR Output

<table>
<thead>
<tr>
<th>Soil conditioning index (SCI)</th>
<th>SCI OM subfactor</th>
<th>SCI FO subfactor</th>
<th>SCI ER subfactor</th>
<th>Avg. annual slope STIR</th>
<th>Wind &amp; irrigation-induced erosion for SCI, t/ac/yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.76</td>
<td>0.49</td>
<td>0.93</td>
<td>0.97</td>
<td>7.23</td>
<td>0</td>
</tr>
</tbody>
</table>
Erosion Analysis

Conventional Field with 75 Ft. Buffer = Same Stream Protection as Direct Seed Field

~ .55 ton/acre /year
## Buffer Requirement

Regulatory agencies see the value of low disturbance system in protecting waterways

*Win-Win for Farmers and Water Quality*

<table>
<thead>
<tr>
<th>Stream Type</th>
<th>STIR</th>
<th>Farmed Smart</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ephemeral/Short Term Intermittent (0-6 Months)</strong></td>
<td></td>
<td>Low Disturbance/High Residue Field is Buffer Any Setback Needed</td>
</tr>
<tr>
<td><strong>Intermittent (7-10 months)</strong></td>
<td></td>
<td>Additional 15 Ft. Setback (Filter Strip Standard)</td>
</tr>
<tr>
<td><strong>Perennial (11+ Months)</strong></td>
<td></td>
<td>Additional 35 Ft. Setback (Filter Strip allowing bank vegetation)</td>
</tr>
<tr>
<td><strong>Perennial Major Fish-bearing Stream Order 6+</strong></td>
<td></td>
<td>Additional 50 Ft. Setback (Filter Strip allowing bank vegetation)</td>
</tr>
</tbody>
</table>

Direct Seed fields have high residue and water infiltration, so waterways are protected from sedimentation and chemical runoff.
Ecology Stream Order Model

- Developed by Department of Ecology
- Ground-truthed by Farmed Smart Auditor
• Developed by NRCS Energy Program

• Technically vetted and tested to be scientific correct

• Quantifies energy, fossil fuel, Nitrogen/Phosphorus usage, and greenhouse emission between a conventional and Farmed Smart operation
- 1400 acre wheat-fallow farm Grant Co.
- Diesel Reduction

<table>
<thead>
<tr>
<th>Diesel Use</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BENCHMARK</strong></td>
<td><strong>PLANNED</strong></td>
</tr>
<tr>
<td>Crop Name</td>
<td>Operation Description</td>
</tr>
<tr>
<td>Wheat</td>
<td>Drill, deep furrow 12 to 18 in spacing</td>
</tr>
<tr>
<td>Sprayer, post emergence</td>
<td>1</td>
</tr>
<tr>
<td>Harvest, killing crop 50pcet standing stubble</td>
<td>1</td>
</tr>
<tr>
<td>Fallow</td>
<td>Shredder, flail or rotary</td>
</tr>
<tr>
<td>Sprayer, post emergence</td>
<td>1</td>
</tr>
<tr>
<td>Chisel, st. pt. 5 in deep, coil tine har</td>
<td>1</td>
</tr>
<tr>
<td>Harrow, spike tooth</td>
<td>1</td>
</tr>
<tr>
<td>Sprayer, post emergence</td>
<td>1</td>
</tr>
<tr>
<td>Sweep plow 20-40 in wide</td>
<td>1</td>
</tr>
<tr>
<td>Fert applic. surface broadcast</td>
<td>1</td>
</tr>
<tr>
<td>Cultivator, field with spike points</td>
<td>1</td>
</tr>
<tr>
<td>Rod weeder</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>6.65</strong></td>
</tr>
</tbody>
</table>
### Cost Comparison: $8000 savings in on 1400 acre farm

#### Per Acre Costs

<table>
<thead>
<tr>
<th>Energy Inputs (Added) to the Field</th>
<th>BENCHMARK Wheat-Fallow 2.00 yr</th>
<th>Cost</th>
<th>PLANNED Wheat-Fallow 2.00 yr</th>
<th>Cost</th>
<th>Cost Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Operations</td>
<td>0.36 MMBTU/ac/yr, Diesel 2.56 Gal</td>
<td>$10.75</td>
<td>0.11 MMBTU/ac/yr, Diesel 0.78 Gal</td>
<td>$3.28</td>
<td>$7.48</td>
</tr>
<tr>
<td>Agrichemicals/Fertilizers</td>
<td>0.67 MMBTU/ac/yr, Agrichemicals 34.1 lb</td>
<td>$25.24</td>
<td>0.70 MMBTU/ac/yr, Agrichemicals 34.4 lb</td>
<td>$26.99</td>
<td>$(1.75)</td>
</tr>
<tr>
<td>Soil Amendments</td>
<td>0.28 MMBTU/ac/yr, Soil Amend 0.03 ton</td>
<td>$0.63</td>
<td>0.28 MMBTU/ac/yr, Soil Amend 0.03 ton</td>
<td>$0.63</td>
<td>$0.00</td>
</tr>
<tr>
<td>Labor</td>
<td>0.0 MMBTU/ac/yr, Labor 0 day</td>
<td>$0.00</td>
<td>0.0 MMBTU/ac/yr, Labor 0 day</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Total:</td>
<td>1.41</td>
<td>$39.83</td>
<td>1.20</td>
<td>$34.10</td>
<td>$5.73</td>
</tr>
</tbody>
</table>

#### Total Field Costs

<table>
<thead>
<tr>
<th>Energy Inputs (Added) to the Field</th>
<th>BENCHMARK Wheat-Fallow 2.00 yr</th>
<th>Cost</th>
<th>PLANNED Wheat-Fallow 2.00 yr</th>
<th>Cost</th>
<th>Cost Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvested Operations</td>
<td>146.74 MMBTU/yr, Diesel 1056 Gal</td>
<td>$4,433.94</td>
<td>146.74 MMBTU/yr, Diesel 1056 Gal</td>
<td>$4,433.94</td>
<td>$0.00</td>
</tr>
<tr>
<td>Field Operations</td>
<td>491.06 MMBTU/yr, Diesel 3533 Gal</td>
<td>$14,837.76</td>
<td>149.62 MMBTU/yr, Diesel 1076 Gal</td>
<td>$4,520.88</td>
<td>$10,316.88</td>
</tr>
<tr>
<td>Irrigation Delivery Energy</td>
<td>0.00 MMBTU/yr, Electricity 0 KWH</td>
<td>$0.00</td>
<td>0.00 MMBTU/yr, Electricity 0 KWH</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Other Delivery Energy</td>
<td>0.00 MMBTU/yr, Electricity 0 KWH</td>
<td>$0.00</td>
<td>0.00 MMBTU/yr, Electricity 0 KWH</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Agrichemicals/Fertilizers</td>
<td>923.91 MMBTU/yr, Agrichemicals 47092.5 lb</td>
<td>$34,824</td>
<td>967.04 MMBTU/yr, Agrichemicals 47523.8 lb</td>
<td>$37,239</td>
<td>$(2,415)</td>
</tr>
<tr>
<td>Soil Amendments</td>
<td>388.15 MMBTU/yr, Soil Amend 34.5 ton</td>
<td>$865</td>
<td>388.15 MMBTU/yr, Soil Amend 34.5 ton</td>
<td>$865</td>
<td>$0.00</td>
</tr>
<tr>
<td>Labor</td>
<td>0.00 MMBTU/yr, Labor 0 day</td>
<td>$0.00</td>
<td>0.00 MMBTU/yr, Labor 0 day</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Total:</td>
<td>1,949.84</td>
<td>$54,959</td>
<td>1,651.52</td>
<td>$47,057</td>
<td>$7,902</td>
</tr>
</tbody>
</table>
• Reduction of Greenhouse Emissions
  - 2450 less gallons used in Field Operations for 1400 acre farm
  - 55,000 pounds of CO2 reduced

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid</td>
<td>Gal</td>
<td>2457.0</td>
<td>54,980.0</td>
<td>1.19</td>
<td>6.83</td>
<td>55,492.8</td>
<td>0.70</td>
<td>44.23</td>
</tr>
</tbody>
</table>
### Certification Benefits

<table>
<thead>
<tr>
<th>Environmental</th>
<th>Regulatory</th>
<th>Farming</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Decrease Soil Erosion by 95%</td>
<td>• Proactive approach to managing regulatory expectations</td>
<td>• Financial Incentives and Patronage Program</td>
</tr>
<tr>
<td>• Improve Water Quality</td>
<td>• Letter from Department of Ecology that certified farmers are meeting water quality regulations in WA state</td>
<td>• Market Premium and/or Access</td>
</tr>
<tr>
<td>• Healthy Soil</td>
<td>• DEQ, Region 10 EPA, &amp; Department of Ag potential support</td>
<td>• Sought after by land-lords, retailers, certification partners</td>
</tr>
<tr>
<td>• Reduced Chemicals through Precision Placement &amp; Cover/Rotations</td>
<td></td>
<td>• Rebates</td>
</tr>
<tr>
<td>• Improve Air Quality</td>
<td></td>
<td>• Tax Credits for Equipment</td>
</tr>
<tr>
<td>• Improve Wildlife Habitat</td>
<td></td>
<td>• Higher ranking on NRCS programs</td>
</tr>
</tbody>
</table>
6 Farmed Smart auditors contracted and trained

- Conservation District Employees
- Certified Crop Planners
- Regional conservation experts

- Tami Stubbs
- Charlie Peterson
- Eric Choker
- Amanda Ward
- Liz Hanwacker
- Jon Merz
Certificate To Date

- 17 farmers certified to date
  - 47,000 acres and 21 miles protected waterways
- 22 applicants interested
- Goal to complete 40 by June 2017 = 125,000 acres
“ensure that the certification provides regulatory certainty or “safe harbor” for producers”

“four important components enable use to provide regulatory certainty

- no-till practices that significantly reduce erosion...
- appropriately sized buffers...
- use of precision ag technology...
- no crop burning...”
Farmers Meet Water Quality Regs
Ecology Support – MOU Signing
• Provide Farmed Smart overview with positive feedback from:
  o Oregon Department of Ag
  o Idaho Department of Environmental Quality
  o Environmental Protection Agency

• Meeting with Oregon Senators and Regulator
  o Feb 24
  o Environmental benefits of direct seeding and FS practices
Market Development Update

• Hired Blue Sky Marketing to develop Farmed Smart strategic marketing plan and partner program:

• Begin developing two PSA’s and one Web Video

• Market development funded by Department of Ecology’s Centennial Clean Water and Federal Clean Water Action (319)
Building Awareness for the Farm Smart Certified Program

Funded by WA Dept of Ecology Grant
Farmed Smart Partner Programs

- Producers
- Distributors
- Environmental
- Consumers
• Tax credit for Farmed Smart farmers providing protected waterways, clean water, lower emissions, less greenhouse gases
  o Farmer’s Are Invested in Low Disturbance and Precision Ag Equipment to Improve Water Quality
    • No-Till Drill: $250,000 ($20,000 savings)
    • Quad Track: $300,000 ($24,000 savings)
    • Self Propelled Sprayer: $200,000 ($16,000 savings)
    • Precision Ag Equipment: $30,000 ($2,400 savings)
    • Stripper Header: $75,000 ($6,000 savings)
    • Combine: $250,000 - $1MM ($20,000 - $80,000 savings)

• Carbon Credit Market
  o Low disturbance = carbon sequestration
Environmental Partners

- WeedIt Infrared Sprayer
- Spot Spraying Green Weeds in No-Till Fallow Field - Reduced 86% chemical application in one pass over 5000 acres
Distribution Partners

- Bakers, Millers, Distilleries, Microbreweries
- Shepherd’s Grain
- PNW Farmers Cooperative
- Whole Foods
- Pepperidge Farms
- Walmart
Connect consumers to farmers
Additional Funding Partners

- NRCS RCPP - Farmed Smart Funding Awarded
  - Palouse Conservation District
    - Funding 1 FS auditor
  - Spokane Conservation District
    - Support FS outreach and education and technical assistance

- Farmed Smart Funding Requested
  - Okanogan Conservation District RCPP
    - Funding Farmed Smart audits, technical assistance for farmers, outreach and education
  - Department of Ecology 319 Funding
    - Farmed Smart implementation support
Additional Funding Partners

• Other Grants
  o Grant County Conservation District
  o Northwest Farm Credit Services
  o Responsible Nutrient Management Foundation
Farmed Smart Difference

- Innovative approach to protecting water quality
- Farmer led voluntary program
- Regulatory and environmental groups working with farmers to protect water quality
- Flexibility in best management practices so farmers can choose what works best in their region
- Holistic review of dry-land farming systems – not just one practice
- Market development for long term funding from public and environmental partners
“Provide information exchange, advocacy on conversation policy issues, and research coordination that supports the adoption of environmentally sustainable and economically viable direct seed cropping systems.”
Established in 2000
• 7 Washington Producer Directors
• 4 Oregon Producer Directors
• 5 Idaho Producer Directors
• 6 Ex Officio Directors – ARS/USDA, University of Idaho, Oregon State University, Washington State University, Spokane Conservation District, Oregon Department of Ag
Funding: Membership & Grants

- Membership
  - Average 250 Members in WA, OR, ID
    - 80% Farmers + Agencies, and Associations

- Certification: 8%
- Partnership: 37%
- Grant: 36%
- Membership: 19%
Other Major Initiatives

- Outreach and Training
- Advocacy on Policy affecting Direct Seed Producers
- Support Research needed for Direct Seeding
Certification Criteria Overview

36 Criteria Evaluated in 6 Categories

- Water Quality: 14, 39%
- Air Quality: 6, 17%
- Soil Quality: 5, 14%
- Wildlife Habitat: 4, 11%
- Energy Conservation: 4, 11%
- Economic Sustainability: 3, 8%

Key:
- Blue: Water Quality
- Light Blue: Air Quality
- Brown: Soil Quality
- Orange: Wildlife Habitat
- Red: Energy Conservation
- Green: Economic Sustainability
Points are awarded on a best management practices rating scale that allows for a variety of management methods and equipment to be used – a results-oriented approach.

Criteria ratings support a variety of direct seed equipment and cropping systems.

Cumulative score must be met with no disqualifying criteria.

Focus is dry-land commodity production ag:

- Grains – Wheat, Barley
- Legumes – Garbanzos, Lentils, Peas
- Oilseeds – Mustard, Rape, Sunflowers, Triticale
- Specialty: Flax, Millet, Quinoa
Water Quality Benefits

Low disturbance and high residue decreases run off by 97%

- Crop residue and root structure keep water in the field

Thunderstorm in central WA carved a 6 foot gully off high disturbance field, causing tons of top soil to be lost

Rill and sheet erosion on high disturbance fields are common around the Palouse & Prairie
Water Quality Criteria

- Soil Tillage Intensity Rating
  - Using NRCS RUSLE2 Model
- Integrated Pest and Nutrient Management Plan
- Soil Testing
- Precision placement of nutrients using at least GPS up to variable rate application
- Implementing buffer strips along water sources with recognition
Air Quality Benefits

- Fields covered year round reduce dust storms
- Reduces emissions and use of fossil fuel

One pass seeding and fertilizing reduces impacts to climate change

Residue and cover crops keep ground covered year-round and protected from wind storms
Air Quality Criteria

- Use NRCS Crop Energy Model to determine reduction of greenhouse emissions
- Validate heights and methods used to keep crop residue in field
- Ensure preparing fields, seeding, and fertilizing occur in 1-2 passes
- No whole field burning
Every drop of water is captured and kept in the soil.

Low disturbance soils have 40-50% higher water infiltration and holding capacity – which means more water available for the crop to grow.
Improves soil health & productivity

Minimizing disturbance of soil improves soil health, structure, and organic matter.

Multi-species cover crop direct seeded near Nez Perce, ID
Soil Health Criteria

- Use of diverse crop rotations and cover crops
- Positive Soil Conditioning Index
- Monitor Soil Organic Matter
- Soil testing
Wildlife Habitat Benefits

- High residue fields provide food and cover for wildlife, increase water infiltration, and decrease sedimentation into streams and waterways, improving fish habitat.
Wildlife Criteria

- Implementation of wildlife practices: windbreaks, wetland preservation, bird houses, pollinators, riparian buffers, watering options, etc.
- CRP and direct seed fields
Energy Conservation Benefits

• Planting in 1 – 2 passes provides a minimum 50% reduction in fossil fuel usage
• Evaluated through fuel usage evaluation and use of alternate or renewable energy sources within their operation
Economic Viability

Reduces operation costs for farmers

- Reduces fuel usage by 50%
- Reduces labor costs by 50%
- Reduces maintenance costs by 40%
- Better utilization of chemicals

Data based on direct seed mentoring program study conduct by Dr. Kate Painter, Ag Economist, 2010
Economic Viability Criteria

- Monitoring budgets, monitoring yields, monitoring input costs, bottom line
- Required to attend at least 4 training events/year
About the Sedimentation Analysis Graph
1. The sediment delivery analysis was conducted using NRCS RUSLE model to evaluate the Farmed Smart Sustainable Ag criteria and the affect of different cropping systems and filter strip sizes to determine their effectiveness in reducing sediment delivery from reaching waterways.
2. The RUSLE analysis was completed using the same assumptions of a 3-year crop rotation of fall wheat, legume, spring cereal; 22” average rainfall; same soil type and filed slopes. The variables that were adjusted were the level of disturbance in the cropping system measured by STIR (Soil Tillage Index Rating) and size of buffers.
3. Sediment Delivery from farm fields is graphed on the left axis with the farming system across the bottom axis. From left it show sediment delivery of a conventional tillage system and the associated sediment delivery. Moving across to the right shows differing levels of buffers and their effect on mitigating sediment delivery into waterways.
4. In the middle of the graph there is a vertical line showing that everything to the right of the line is below a 30 STIR rating (Soil Tillage Intensity Rating) which qualifies under NRCS practice standards as direct seed. The circle shows all of the direct seed systems’ effect on sediment delivery with and without buffer systems.
5. The right hand axis and the red line show the STIR rating of each system. It is only a coincidence that the Conventional system sediment delivery bar meets the conventional system STIR rating of 108.
Key Findings

1. The horizontal orange line shows the sediment delivery of a conventional tillage system with a 35 ft. buffer. All of the direct seed and no-till systems easily achieve near 50% reductions above the best conventional system with a 35 Ft. buffer and they can do that without the implementation of a buffer along the waterway. With minimal setbacks from streams (5-10 Ft.) using direct seed or no-till, we can achieve up to 96% reductions in sediment delivery and associated nutrient runoff into waterways!

2. Direct Seed systems are providing substantial protection to waterways from sedimentation and chemical run off, which are the main drivers for non-point pollution in ephemeral and intermittent streams and these upland practices need to be acknowledged when determining buffer widths.

Summary of Stats

- Conventional system (Conv) with a 108 STIR without buffers along waterways has an approximate sediment delivery of 6.28 tons/acre/year.
- A conventional system with a 35 foot buffer has approximate sediment delivery of .855 tons/acre/year (an 86% reduction in sedimentation delivery without a buffer)
- A Direct Seed two pass system (DS) of a 20 STIR without buffers along waterways has an approximate sediment delivery of .55 tons/acre/year (36% better protection from sediment delivery than a conventional system with 35 foot buffer).
- A Direct seed system with a 10 foot buffer further reduces sediment delivery to .24 tons/acre/year (72% better protection from sedimentation delivery than a conventional system with a 35 foot buffer).
- A direct seed field without a buffer provides about the same protection from sediment delivery as a conventional system with a 75 foot buffer.