Teagasc Spring Webinar Series



New Zealand Approach to Catchment Management and Water Quality

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Noel Meehan & Ivan Kelly

Joint Study Trip to New Zealand

- Participants
  - Jenny Deakin – EPA
  - Bernard Harris – DAFM
  - Margaret Keegan – LAWPRO
  - Noel Meehan - Teagasc
- Purpose of Trip
  - Learn how New Zealand manages agricultural pressures on water
  - To assess mitigation measures and new technologies
  - To enhance collaboration between EPA, DAFM, LAWPRO and Teagasc
- Itinerary
  - FLRC Conference and Catalyst Workshop – Massey University & farm visits
  - Land & Water Challenge – Lincoln University and Cantebury RC
  - Lincoln Agritech – Research Update
  - Bay of Plenty RC and farm visits

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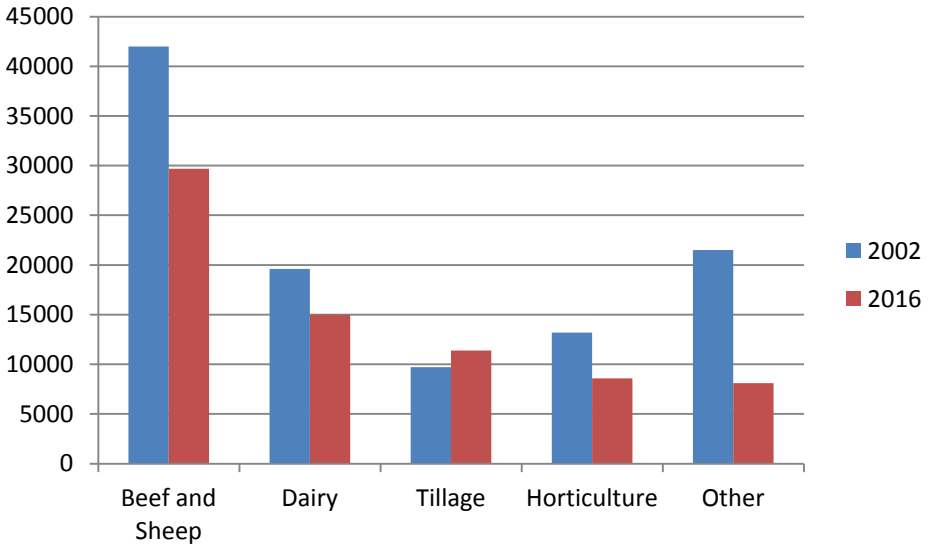
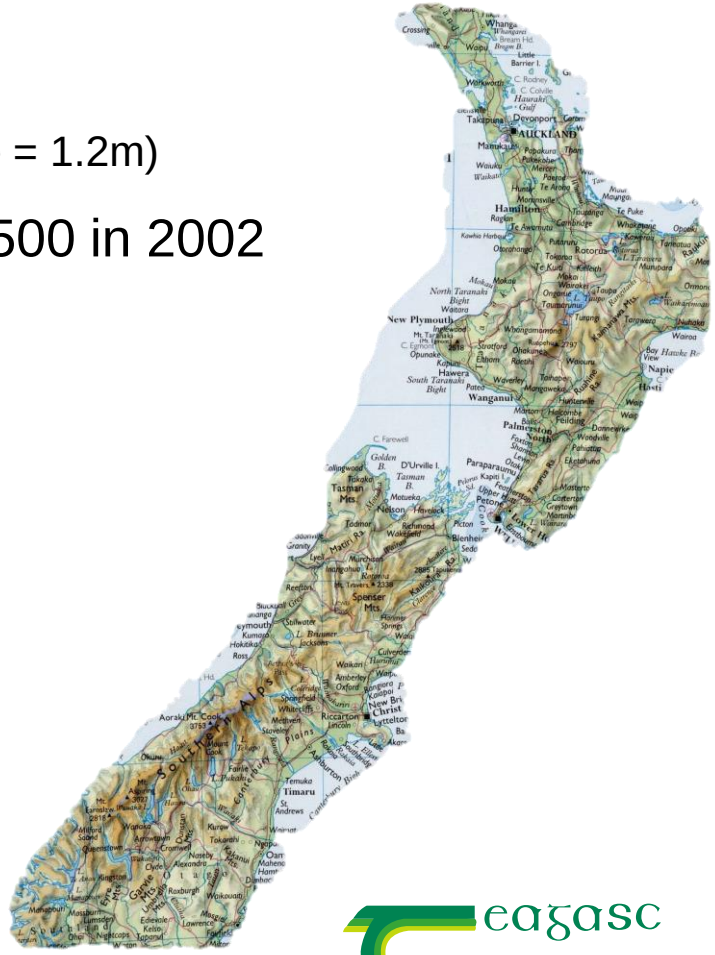
Farming in New Zealand

- New Zealand = 286,000 km2, Ireland = 84,500 km2
- Weather :
  - moist and warm, can have drought in summer
  - long growing season and out wintering of cattle
  - Rainfall ranges from 0.6m -10m per year (Athenry Ave = 1.2m)
- 52800 Farms/Holdings in 2016 down from 69500 in 2002





- Other: pigs, poultry, deer, forestry,
- Source Stats NZ

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Farming in New Zealand

- 15,000 dairy farmers and employ ~30,000 people on farms with thousands more in support employment
- Dairy is NZ largest single export industry providing 25% of export income
- Ave herd size is 376 cows producing 1.4 billion kgs milk solids
- Irrigation a major part of south island farming, less so in north island

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Farming in New Zealand

- Farm subsidies removed ‘over night’ in early 1980’s due to economic problems
- Survival of the fittest – ‘no frills farming’
- Large scale expansion and intensification
- Lack of input controls/regulation
- Engine of economic recovery
- Agriculture has suffered recently from bad press over environment issues
- Is addressing water quality issues, GHG progress at similar stage as Ireland
- Major nutrient of concern – Nitrogen

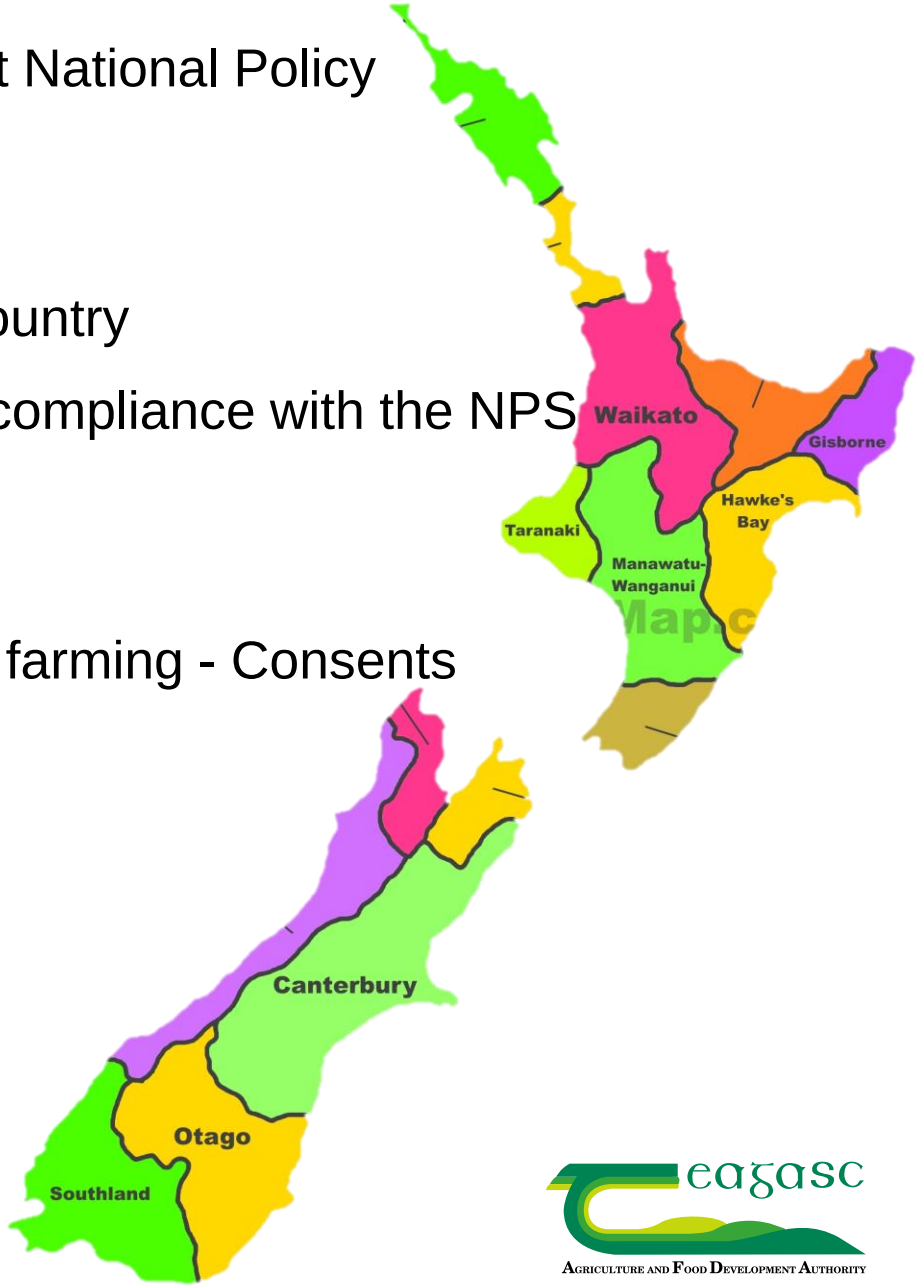
Farming in New Zealand

- **Why is Nitrogen the concern?**

- Stocking rates can be very high
- Out wintering of cows with little or no housing
- High concentrations of urine patches in a paddock
- Free draining volcanic soils
- High intensity rainfall
- Over use of irrigation
- 1990 – 59,000 T N
- 2015 – 429,000 T N

New Zealand – Governance Structures

- Central New Zealand Government set National Policy Statements (NPS)
- NPS for Water = NZ version of WFD
- Set out water quality targets for the country
- 16 Regional councils responsible for compliance with the NPS for their region
- 16 different plans for complying
- Councils responsible for regulation of farming - Consents



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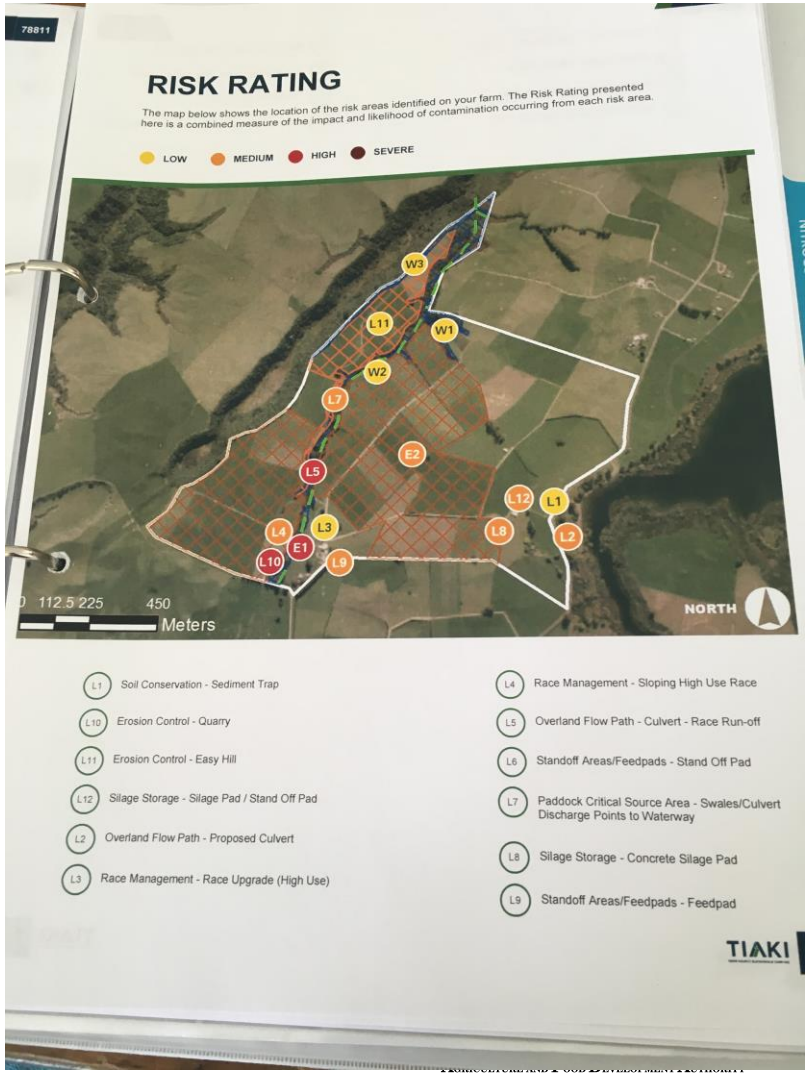
Water Quality Plans

- Regional council decides parameters of plans
  - Set targets for level of Nitrogen loss permitted
  - Land Use Capability (LUC) used to decide on levels of loss
- Use **'Overseer'** to aid farmers to reach targets
- Overseer is a decision support tool for farmers – uses modelling and is complicated and continually changing
- Farmers must prepare a Farm Environment Plan on Overseer
  - optimisation of nutrient use & mitigation actions
  - designed to help farm meet targets over 15 years
- Plan must be approved by council and a '**Consent**' is given to farm
- Plan subject to audit every 3 years

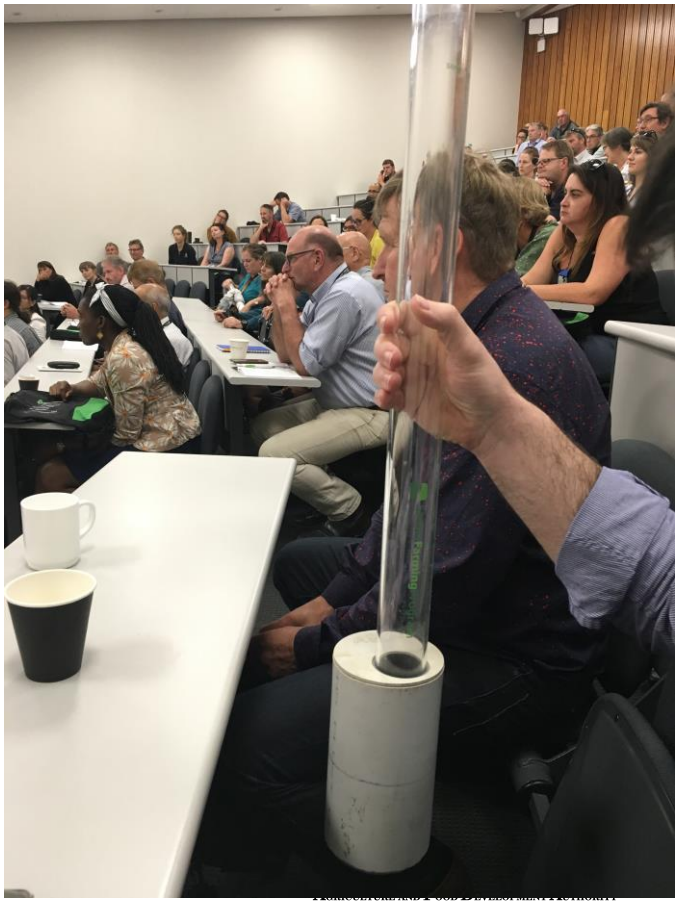
Issues

- Output Risk based approach vs. Input based approach
  - N loss from farm vs. limits on N use
- Some targets are set low compared to level of intensity
- Some farms will not be able to reach target set by council by mitigation and optimisation alone
- Hoping to ‘Innovate’ way out of problem



Mitigation ideas

- **Very similar to Irish mitigation**
- Bio reactors, use of natural attenuation in ground water, constructed wetlands and riparian margins, optimisation of nutrient use, capture drainage water in ponds and reapply
- On/off grazing in late summer – drought conditions, to reduce N load during poor growth
- Use of soil moisture readings to decide on soiled water application



Mitigation ideas

- **Technological solutions:**
- Spikey – treat urine patches

- Digital analysis of weather, growth and crop/soil to provide advice to farmers on when to apply fertilisers
- Improved irrigation management
- Cleartech – separates out solids from water in dairy washings

Mitigation ideas

- Use of detainment bunds
- Animal diet management
- Use of smart fencing
- Soil moisture sensors
- Flushing ground water to dilute N concentration
- Multiple species grassland – Plantain and traditional grasses

Example of a Detainment Bund in Rotorua

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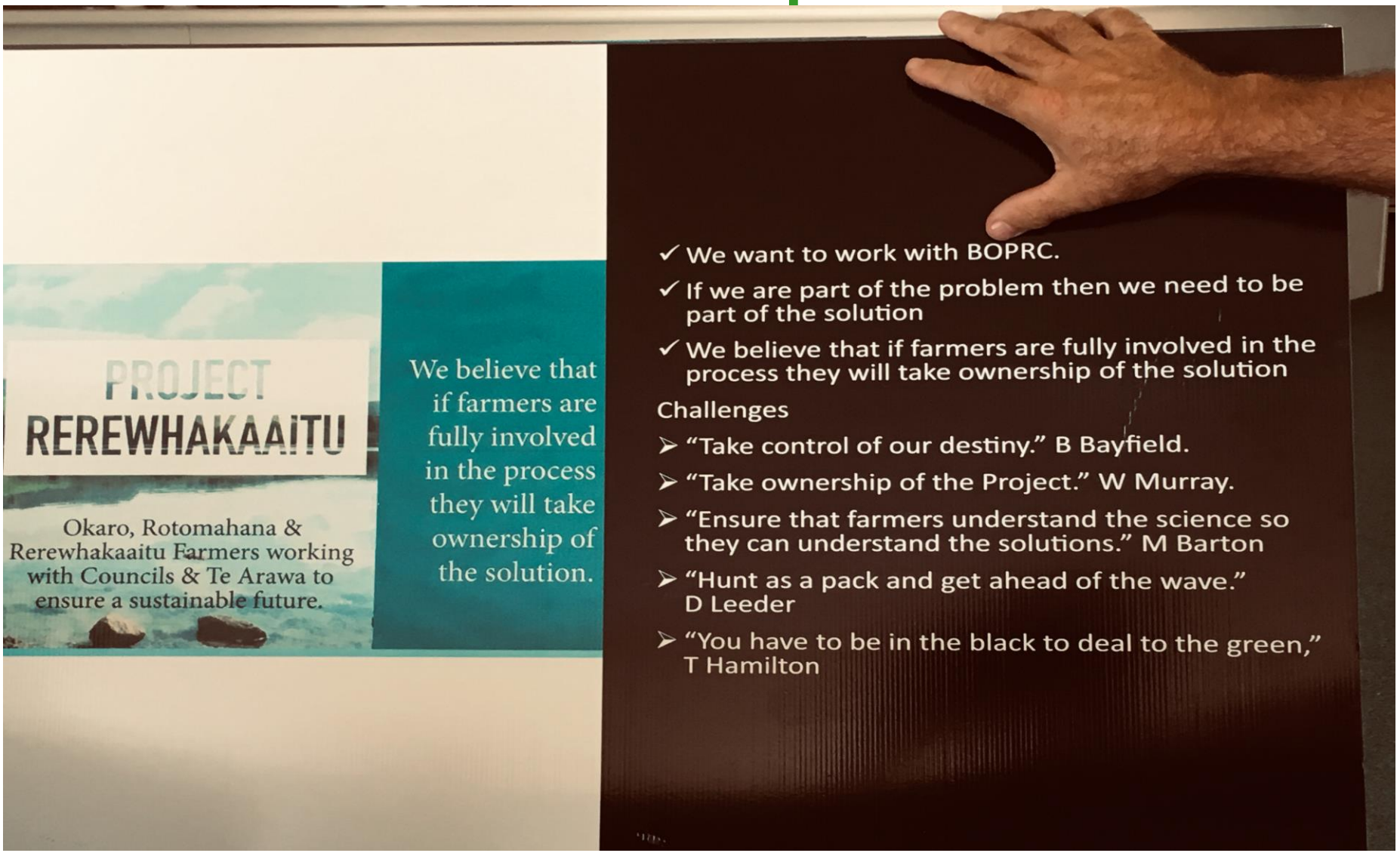
Farmer Perspective

- Project Rerewhakaaitu, Rotorua – Bay Of Plenty Farmers Mac Pacey and Chris Sutton

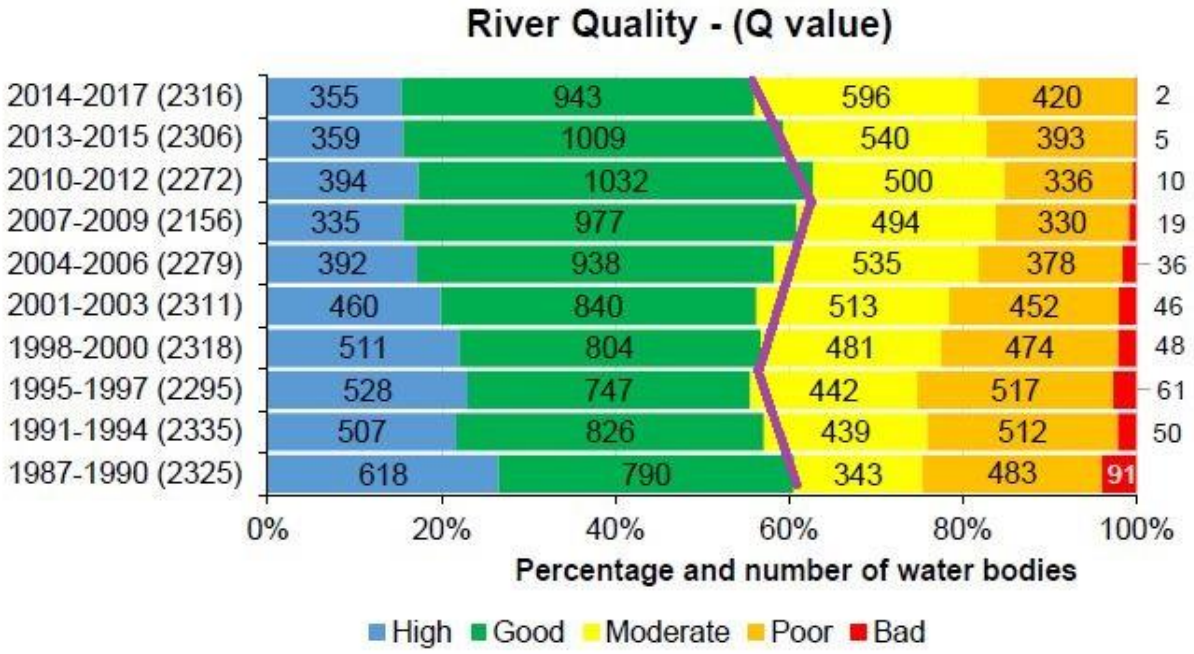
- Issues with P loss
- Farmers formed a ‘collective’
- Part of the problem - part of the solution
- Developed a plan and provided support
- Farmer access to science – debated
- Use of Overseer and FEP
- Key to success – Good Facilitator between Farmers and Council

Farmer Perspective



What is The ASSAP?

- **A**gricultural **S**ustainability **S**upport and **A**dvisory **P**rogramme
- Focus is on water quality in 190 Priority Areas for Action (PAA)
- Provides free farm advice and acceptance is voluntary
- 30 Advisors - 20 Teagasc, 10 from Dairy Co-ops
- Work in collaboration with Local Authority Catchment Assessment Teams
- Under the Water Framework Directive Ireland is required to have all water at 'Good Status' ★★★★



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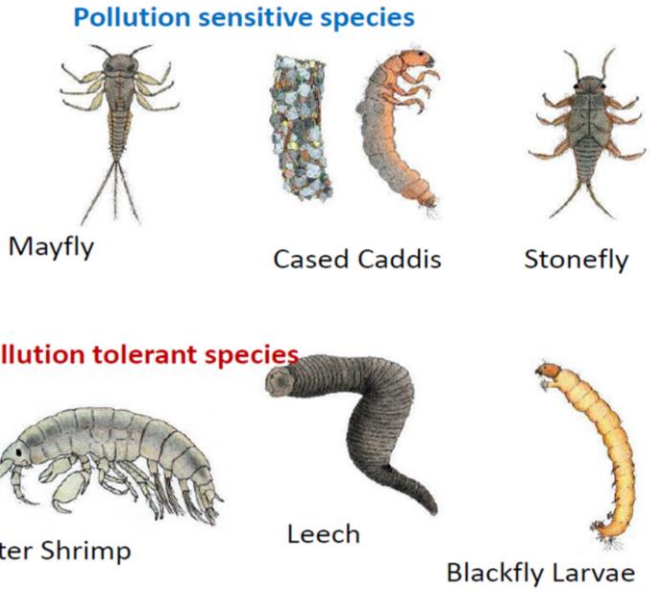
How does it work?

- Public information meeting

- Farmer information meeting

- Letter sent to each farmer in the PAA on behalf of the ASSAP by the DAFM
- Provide information on water quality in stream and the farm assessment



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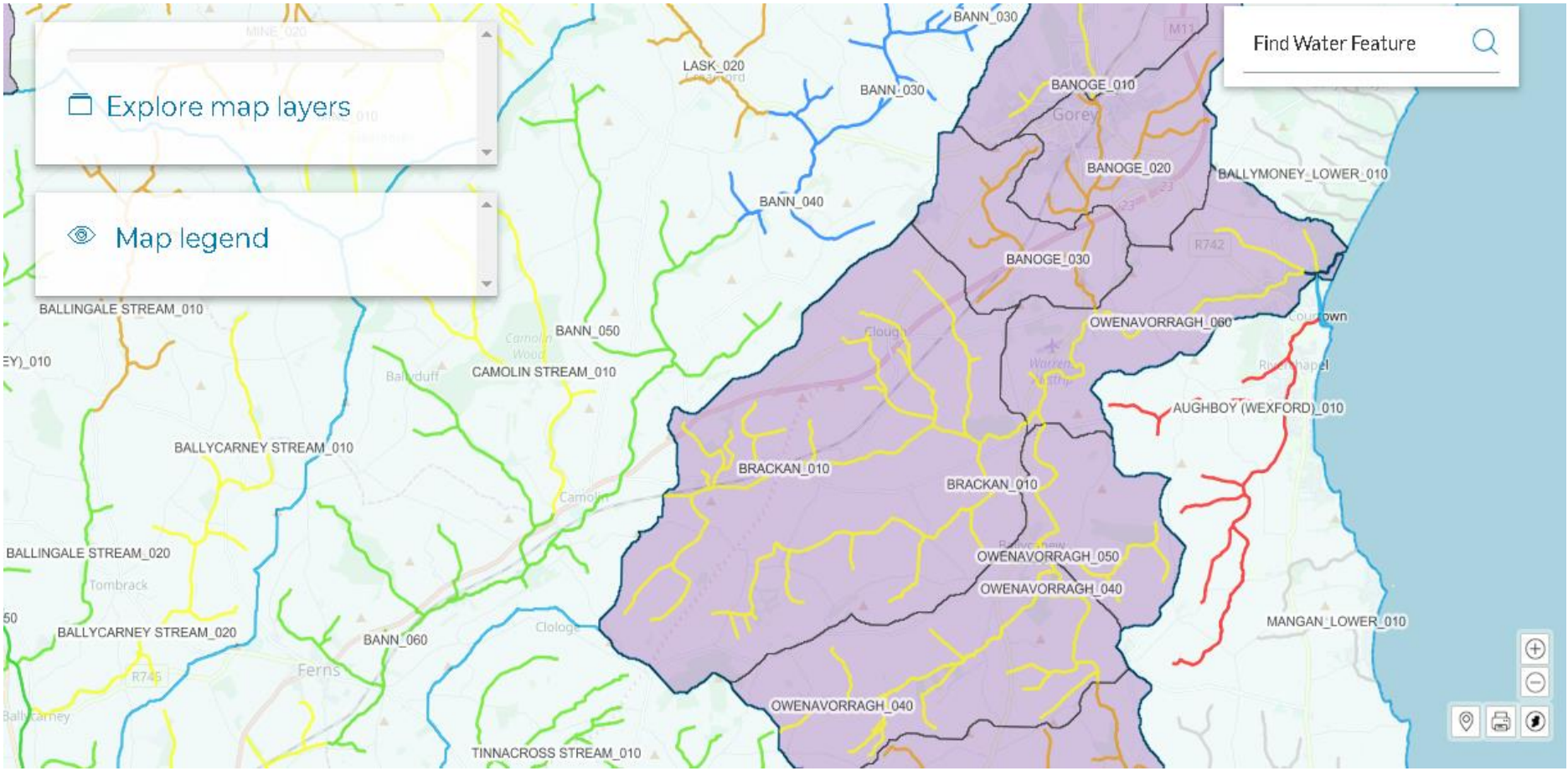
How does it work?

- Catchment Assessment Teams assess stream – desk study, chemical, biological, hydromorphology etc.



Advisor Farm Assessment

- Farm assessment will focus on 3 areas
  - Farmyard management and practices
  - Nutrient management, application practices and pesticides use
  - Farmland and stream management
- Nutrient loss from farms:
  - Point Sources
  - Diffuse Sources
- Mitigation actions designed to '**Break the Pathway**' and prevent nutrient loss from farms

What Causes Diffuse P & Sediment Loss?

1. Most losses from low permeability soils
2. Heavy rainfall leads to overland flow of water
3. P and soil sediment washed off into drains & streams

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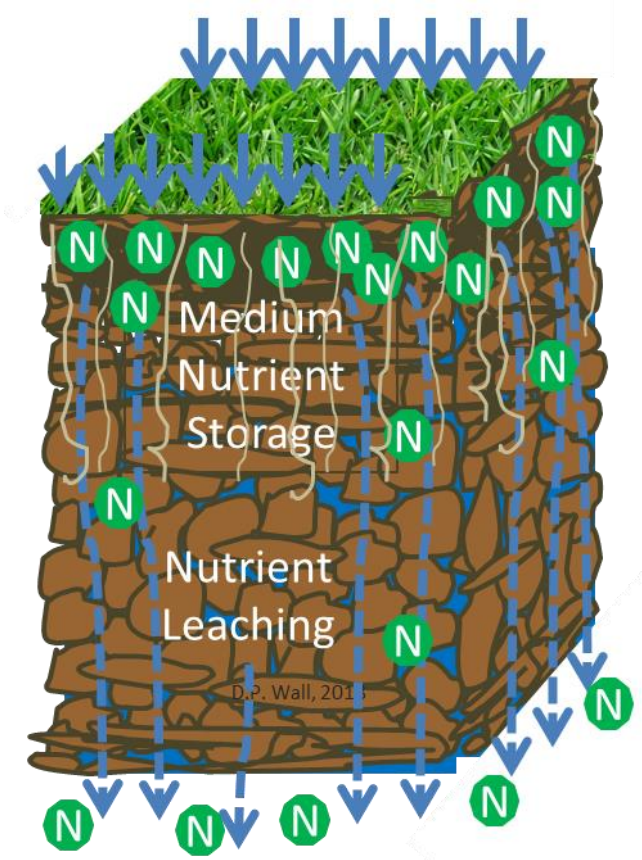
What Causes Diffuse N Loss?

1. Most N losses from free draining soils
2. N does not bind tightly to soil
3. Leaching occurs where more N applied than plant needs
4. Excess N is ***leached*** by rain to waters



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Thank You

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