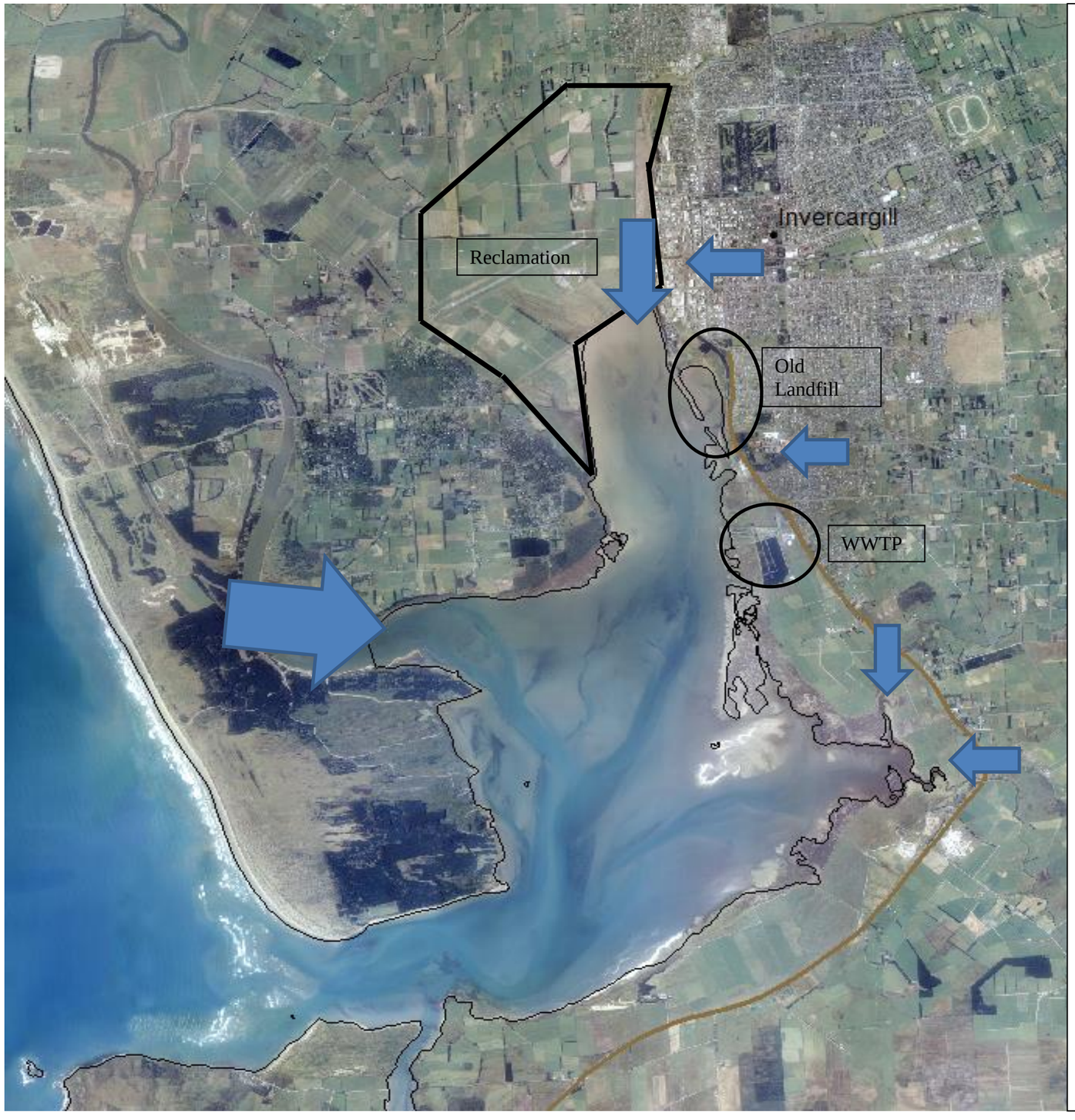
New River Estuary – Urban Point Sources



Reclamation

- Ships with at least 9' draft were able to reach the Stead Street wharf in the early 1900's.
- Reclamation began in the area north west of Stead Street around 1910.
- Methods consisted of *Spartina* planting and rock groyne walls to enhance sedimentation.
- Clean fill and rubble from demolished buildings was added, with topsoil forming the final layer.
- In 1934 Invercargill Airport was built.

Landfilling

- Between 1930 and 1950, the community began dumping refuse south of the Stead Street Wharf.
- Refuse piles migrated south with time towards the area now known as 'Pleasure Bay', and were used as a base for further reclamation.
- In the 1970's a causeway was built to prevent refuse from floating into the estuary.
- The landfill was closed in 2004, and 'metamorphosed' into a public recreation area. This won a 'Green Ribbon Award' in 2007 for environmental rehabilitation.
- Recent observations have shown leachate seeps around the fringes of the old landfill.
- An initial sapling investigation revealed TN, NH4 and TKN concentrations in excess of 200 mg/L.

WWTP

- A single septic tank treatment system was constructed in 1910.
- A further parallel tank was added sometime before 1958.
- The treatment plant underwent an upgrade between 1959 and 1969 to cope with the expanding population. This consisted of new pipes, extensions, intercepting trunk sewers, pumping stations and a primary treatment plant.
- A secondary treatment facility was added in 1992 and equipment was further upgraded.
- Maturation ponds and wetlands were built in 2004.
- Discharge release is timed to outgoing tide.
- The concentration of nutrient discharge is considerable, and heavy metals are also a concern.
- Recently a contract has been signed to accept leachate from a Class A landfill in Southland.
- No testing of potential leachate toxicants currently occurs.

In Flows

- Loads have been calculated from state of environment monitoring sites or can be estimated from land use.

We are seeking advice on the most efficient ways to answer the following questions:

- How can we link adverse ecological impacts to local point source discharges (landfill, WWTP, stormwater)?
    - Is nutrient loading from landfill leachate, WWTP discharge, or stormwater inflows enhancing macroalgal growth throughout the estuary?
    - Does the ecology of NRE change in proximity to any of these point sources?
    - Can we detect point source contaminates in other biological organisms in the area (e.g. fish, shellfish)?
    - Are heavy metals a problem?

- What is the annual load being discharged from each point source?
    - Where is this load distributed?
    - Is this a problem?

- Is there anything else we need to know?

Contact: Nick.Ward@es.govt.nz
James.Dare@es.govt.nz

WWTP Concentrations 1999-2015 (mg/L)

	TN	NO3	NH4	DRP	Copper	Zinc	Chromium	Nickel	Lead
Max	74	13	36	7	0.334	0.055	0.011	0.022	0.039
Min	11	1	10	1	0.006	0.013	0.001	0.001	0.001
Median	27	3	19	4	0.0155	0.03	0.004	0.006	0.001
Mean	28	4	19	4	0.0247	0.031	0.0042	0.0074	0.0023
Kg/Day	712	95	482	98					

Landfill Leachate Samples 8th July 2014

Analyte	Unit	20142259	20142260	20142261	20142262	20141835	20141836
Total Alkalinity	mg/L	1089	548	1829	600	2354	2143
Total Hardness	mg/L	531	388	507	430	680	832
EC	uS/cm	2445	1771	4780	2054	6940	6030
Iron	mg/L	25.4	6.37	21.3	4.54	23.9	28.2
Magnesium	mg/L	51.7	41.5	58.8	53.9	86.6	93.3
Total N	mg/L	123	10	295	49	284	247
Ammoniacal N	mg/L	101.9	3.74	271	36.1	310	273
TKN	mg/L	122	10	295	48.9	284	246
Boron	mg/L	1.5	0.663	2.33	0.585	1.81	1.71
Potassium	mg/L	121.2	76	236	70.6	275	270
DOC	mg/L	58	45	114	34	128	113
E coli	Cfu	160	10	10	121		