Benefits and Issues arising from use of GSI to affect In-season Management

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Sub-title: Life on the Run

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A. Nothing New … *but it should be a useful necessity!*
(costly, demanding of staff, and maybe more practical in some fisheries and not others)

• Original applications by ADF&G development of scale pattern analysis; IPSFC long-standing use of scale analysis for Fraser River sockeye, and ADF&G/DFO development of stock identification in the Northern Boundary Area (uses multiple traits).

• Early allozyme applications in Washington/Oregon State ocean fisheries, and Columbia River net fisheries; subsequently for SBC Pink salmon by PSC

• Recent DNA in-season applications include CDFO's use in Northern BC troll fisheries (Winther and Beacham 2006) and PSC/DFO's application to Fraser River sockeye salmon management.

Each application addressed a specific question and/or was able to limit the spatial scale of the fishery (i.e., limits range of stocks)

B. *But what does GSI tell a manager when considered on its own … depends on the sampling design.*

Sampling	Comments/Info
1. A single point sample	Presence/Absence of stocks Relative composition of stocks Weak inferences and unknown how representative the sample is.
2. Multiple samples within a fishery strata	Improved accuracy of composition (assuming no biase in gear), & measure of precision of estimate and of repeatability of samples
3. Multiple samples between fisheries within one time strata	Presence/Absence of stocks Indication of spatial variation in composition of stocks, No improvement in sample accuracy unless assuming samples from one mixture.
4. Multiple samples within and between fisheries	Builds on 2. + 3. and allows examination of spatial variation (single or multiple mixtures?) >> accuracy and precision of composition
5. Multiple samples within and between fisheries strata (time and space)	Builds on 4 but costs are climbing! Measures of stock composition, distribution & run timing of stocks.

In the absence of additional information, GSI does not provide any inference regarding abundance (other than relative) or harvest rates.

With added information from hypotheses, assumptions, models and predictions; then GSI can become more informative for the In-season management (e.g.,

- observed versus predicted stock compositions

- equality of stock compositions by gear types or size limits, etc.

- presence of stocks not accounted for by CWT program

- run-timing abundances (if coupled with an index of abundance)

- samples could be collected from fisheries w/o CWT sampling.

Pitfalls to In-season applications:

➤ How representative are the collected samples? Repeatability of samples is seldom tested.

➤ It will be very costly if applied to sampling for rare occurrence of a small stock ("needle in the haystack" analogy … how would you ever assess accuracy?)

➤ Statistical basis for a sampling design? (Are sample sizes determined because they are affordable and practical to process in time?)

➤ Can GSI methods address the assumptions of natural stocks being represented by hatchery indicator tag groups?

➤ The technology is evolving rapidly, maybe more rapidly than the tool is needed. Apply it where it is most needed and apply it well.