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AGE AND GROWTH STUDIES TASK

Resource Ecology and Fisheries Management Division

NEWSLETTER #4

August 1983

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OCT 5 1983

Age and Growth Studies Task, REFM
(Newsletter #4)

1. 2nd PMFC sponsored ageing workshop at NWAFC scheduled for August 3-5, 1983

Included on the agenda for this meeting was a review of comparative inter-agency ageings of Pacific ocean perch otoliths by 2 methods: surface and break-and-burn (BB). For this purpose a POP sample of 300 otoliths had been prepared earlier by the Washington State Department of Fisheries ageing unit. The sample included specimens collected in July 1982 off Cape Flattery, Willapa and Astoria (100 from each area). It was then circulated among age readers of the participating agencies. All of these provided results by at least one ageing method, and 3 agencies provided results by both methods. Paired comparisons obtained are shown in Figures 1-3.

During the next workshop another, smaller POP sample will be aged by the participants, using the criteria agreed upon in April. It is hoped that the results from this sample can be summarized in a similar fashion and jointly reviewed before the conclusion of the 2nd workshop.

2. Changes in editing based on cruise age-length key information

Past edit procedure was found to be very time consuming. To save time, future editorial modifications of age-readers results will be limited to omitting otoliths read but found to be associated with questionable (in the editors view) fish length or length-weight information in the original field sampling data. As always, the editor performing the change is identified in the permanent record maintained for each age structure received from RACE and REFM for ageing.

This differs from past practice in that reader-assigned ages are no longer subject to editorial modification. With the present change, only one interactive computer session will be required for the edit process.

3. Atlantic cod otolith negatives received

On his recent trip to Norway, Vidar Wespestad obtained negatives of broken/burned sections of 22 representative otoliths of Atlantic cod. These have been enlarged for reference purposes and comparisons of similar material from specimens of Pacific cod at NWAFC.

4. Production readings completed^{1/}

Since the beginning of FY83 the Ageing Unit has read 19,607 otoliths excluding replicate reading tests.

The following samples were read between May 1 and June 30:

Species	Area	Year	No. age
Pollock	Bering	1982	1,480
	GOA	1982	701
Flathead sole	Bering	1982	290
TOTAL ^{2/}			2,471

1/ Samples put on Master files

2/ Excludes 20% replicate testing

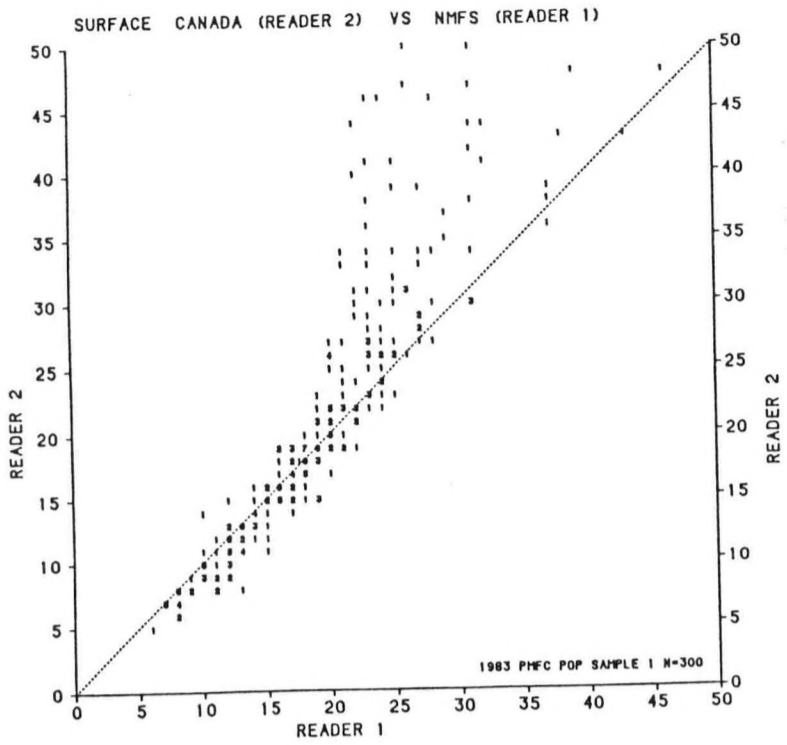
Reader time for non-production objective was required for:

- (a) PMFC; POP test sample readings
- (b) PMFC; preparing draft of Ageing Manual
- (c) RACE/Special Project; removal of scales from frozen pollock specimens and preparation of plastic scale impressions
- (d) Ageing of pollock fin ray sections and otoliths in collaboration with Han Lin Lai
- (e) Reader training (arrowtooth flounder)

5. Personnel

Jack LaLanne quietly retired last month without the usual fanfare and center wide send off so usual with a person of such long service at the Center. His experience and knowledge of ageing many species of fish will be missed by all of his co-workers and friends throughout the Center.

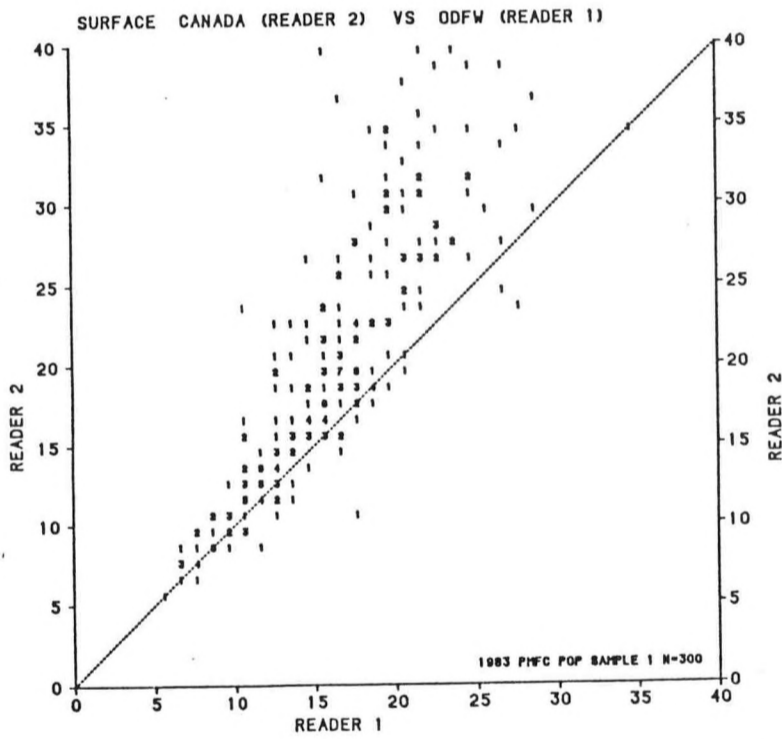
Figure 1A. Interagency POP surface method



*** R VERSUS T ***

CRUISE# 020CZ		DATE# 1982		SPECIES# 301			
AGE	# AGED	1 AGR	CUM-1	-BIAS	+BIAS	-1 BIAS	+1 BIAS
5	1	0.0	0.0	1.0	0.0	1	0
6	2	0.0	0.0	2.0	0.0	0	0
7	7	42.9	30.0	4.0	0.0	4	0
8	8	37.5	33.3	5.0	0.0	2	0
9	8	12.5	26.9	7.0	0.0	3	0
10	7	42.9	30.3	4.0	0.0	1	0
11	12	8.3	24.4	10.0	1.0	5	1
12	13	61.5	32.8	4.0	1.0	2	1
13	15	60.0	38.4	4.0	2.0	3	2
14	7	57.1	40.0	2.0	1.0	1	0
15	15	13.3	35.8	11.0	2.0	5	1
16	12	50.0	37.4	3.0	3.0	2	2
17	11	36.4	37.3	6.0	1.0	5	1
18	16	62.5	40.3	3.0	3.0	3	1
19	23	26.1	38.2	5.0	12.0	2	7
20	8	62.5	39.4	1.0	2.0	1	2
21	7	0.0	37.8	2.0	5.0	2	2
22	13	15.4	36.2	2.0	9.0	1	3
23	7	42.9	36.5	2.0	2.0	1	0
24	4	50.0	36.7	0.0	2.0	0	1
25	4	0.0	36.0	0.0	4.0	0	0
26	12	8.3	34.4	0.0	11.0	0	2
27	9	11.1	33.5	1.0	7.0	1	0
28	4	0.0	32.9	0.0	4.0	0	2
29	4	0.0	32.3	0.0	4.0	0	0
30	7	0.0	31.4	3.0	4.0	3	0
31	7	0.0	30.5	0.0	7.0	0	0
32	1	0.0	30.3	0.0	1.0	0	0
33	1	0.0	30.0	0.0	3.0	0	0
34	6	0.0	29.2	0.0	6.0	0	0
35	1	0.0	29.1	0.0	1.0	0	0
36	2	0.0	28.9	1.0	1.0	1	0
37	1	0.0	28.8	0.0	1.0	0	0
38	3	0.0	28.5	0.0	3.0	0	1
39	1	0.0	28.1	0.0	1.0	0	0
40	1	0.0	28.0	0.0	1.0	0	0
41	3	0.0	27.7	0.0	3.0	0	0
42	1	0.0	27.6	0.0	1.0	0	0
43	2	50.0	27.8	0.0	1.0	0	0
44	3	0.0	27.5	0.0	3.0	0	0
46	3	0.0	27.2	0.0	1.0	0	0
47	2	0.0	27.0	0.0	2.0	0	0
48	2	0.0	26.8	0.0	2.0	0	0
50	2	0.0	26.6	0.0	2.0	0	0
51	1	0.0	26.5	0.0	1.0	0	0
58	1	0.0	26.4	0.0	1.0	0	0

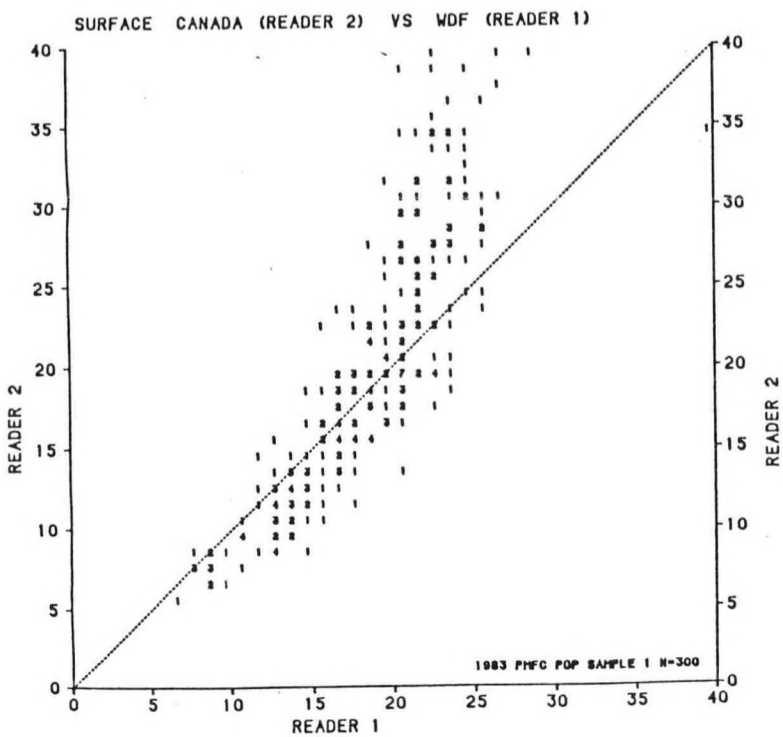
PERCENT AGREEMENT = 26.4 (75 TESTS)
 PERCENT PLUS BIAS = 44.4 (126 TESTS)
 PERCENT MINUS BIAS = 29.2 (83 TESTS)
 TOTAL SAMPLE SIZE = 300
 TOTAL NUMBER VALID COMPARISONS = 284
 TOTAL NUMBER READER AND TESTER UNABLE TO AGE = 0
 TOTAL NUMBER TESTER UNABLE TO AGE = 15
 TOTAL NUMBER READER UNABLE TO AGE = 1



*** R VERSUS T ***

CRUISE# 022C0		DATE# 1982		SPECIES# 301			
AGE	# AGED	1 AGR	CUM-1	-BIAS	+BIAS	-1 BIAS	+1 BIAS
5	1	100.0	100.0	0.0	0.0	0	0
6	2	50.0	66.7	1.0	0.0	1	0
7	7	57.1	60.0	0.0	3.0	0	3
8	9	55.6	57.9	2.0	2.0	1	1
9	8	25.0	48.1	3.0	3.0	3	1
10	8	12.5	40.0	2.0	5.0	0	3
11	12	33.3	36.3	3.0	5.0	2	5
12	13	23.1	35.0	1.0	9.0	1	5
13	16	0.0	34.4	1.0	15.0	1	4
14	7	0.0	25.3	1.0	6.0	0	2
15	14	41.4	24.7	2.0	9.0	2	3
16	12	0.0	22.0	1.0	11.0	1	4
17	11	13.2	21.7	1.0	8.0	1	3
18	16	25.0	22.1	1.0	11.0	1	3
19	8	0.0	19.0	1.0	21.0	1	1
20	7	0.0	17.9	0.0	7.0	0	0
21	8	12.5	18.7	0.0	7.0	0	0
22	13	0.0	16.7	0.0	13.0	0	0
23	7	0.0	16.1	1.0	5.0	0	0
24	4	0.0	15.7	1.0	3.0	0	0
25	4	0.0	15.4	0.0	4.0	0	0
26	12	0.0	14.6	0.0	12.0	0	1
27	9	0.0	14.0	0.0	9.0	0	1
28	4	0.0	13.7	0.0	4.0	0	0
29	5	0.0	13.4	0.0	5.0	0	1
30	7	0.0	13.0	0.0	7.0	0	0
31	7	0.0	12.7	0.0	7.0	0	0
32	1	0.0	12.4	0.0	1.0	0	0
33	3	0.0	12.4	0.0	3.0	0	0
34	7	14.3	12.5	0.0	6.0	0	0
35	1	0.0	12.5	0.0	1.0	0	0
36	2	0.0	12.4	0.0	2.0	0	0
37	1	0.0	12.3	0.0	1.0	0	0
38	3	0.0	12.2	0.0	3.0	0	0
39	3	0.0	12.0	0.0	3.0	0	0
40	1	0.0	12.0	0.0	1.0	0	0
41	3	0.0	11.9	0.0	3.0	0	0
42	1	0.0	11.8	0.0	1.0	0	0
43	1	0.0	11.8	0.0	1.0	0	0
44	3	0.0	11.4	0.0	3.0	0	0
45	3	0.0	11.3	0.0	3.0	0	0
47	2	0.0	11.4	3.0	2.0	0	0
48	2	0.0	11.3	0.0	2.0	0	0
50	2	0.0	11.3	0.0	2.0	0	0
51	1	0.0	11.2	0.0	1.0	0	0
58	1	0.0	11.2	0.0	1.0	0	0

PERCENT AGREEMENT = 11.2 (32 TESTS)
 PERCENT PLUS BIAS = 81.1 (232 TESTS)
 PERCENT MINUS BIAS = 7.7 (22 TESTS)
 TOTAL NUMBER COMPARISONS = 286

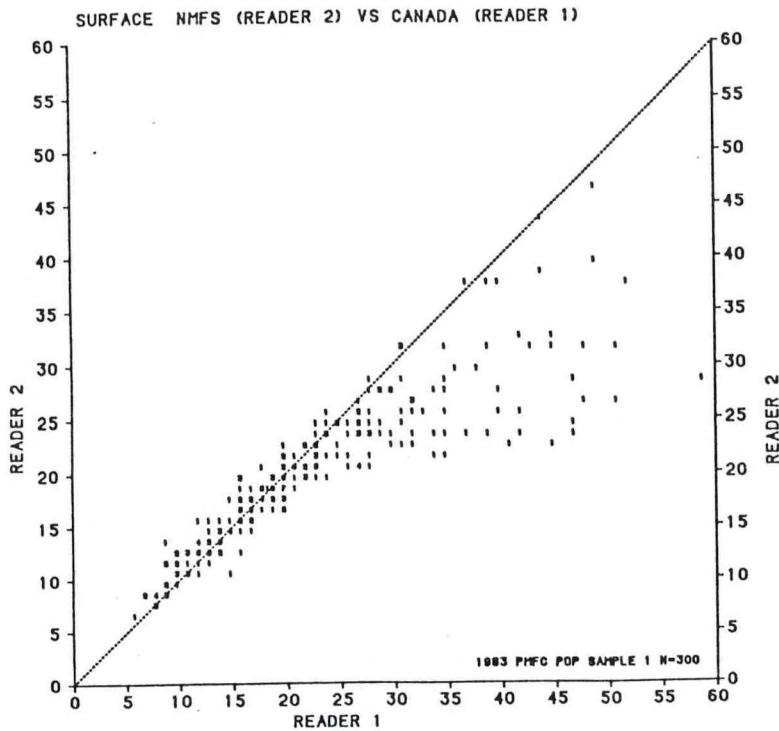


*** R VERSUS T ***

CRUISE# 022C0		DATE# 1982		SPECIES# 301			
AGE	# AGED	1 AGR	CUM-1	-BIAS	+BIAS	-1 BIAS	+1 BIAS
6	1	0.0	0.0	0.0	1.0	0	1
7	4	75.0	60.0	1.0	0.0	1	0
8	7	28.6	41.7	0.0	5.0	0	3
9	2	0.0	35.7	0.0	2.0	0	1
10	6	16.7	30.0	0.0	5.0	0	4
11	4	25.0	29.2	2.0	1.0	1	0
12	11	16.7	23.8	2.0	13.0	1	4
13	17	29.4	25.4	1.0	11.0	1	4
14	13	7.7	22.2	2.0	10.0	0	3
15	11	18.2	20.5	4.0	5.0	2	1
16	74	16.7	21.7	8.0	12.0	2	4
17	16	0.0	17.9	7.0	9.0	2	2
18	22	18.2	17.9	9.0	9.0	2	5
19	18	11.1	17.2	11.0	5.0	4	1
20	34	5.9	15.2	17.0	14.0	2	7
21	23	0.0	13.6	21.0	2.0	2	0
22	22	9.1	13.2	14.0	6.0	0	0
23	21	4.8	12.5	16.0	4.0	0	1
24	9	11.1	12.5	3.0	0.0	0	0
25	10	0.0	12.1	6.0	2.0	0	1
28	8	0.0	11.7	5.0	0.0	0	0
28	5	0.0	11.5	5.0	0.0	0	0
31	1	0.0	11.5	1.0	0.0	0	0
35	1	0.0	11.4	1.0	0.0	0	0
39	1	0.0	11.4	0.0	1.0	0	0

PERCENT AGREEMENT = 11.4 (34 TESTS)
 PERCENT PLUS BIAS = 37.3 (117 TESTS)
 PERCENT MINUS BIAS = 45.3 (147 TESTS)
 TOTAL NUMBER COMPARISONS = 298
 TOTAL NUMBER UNABLE TO AGE = 2

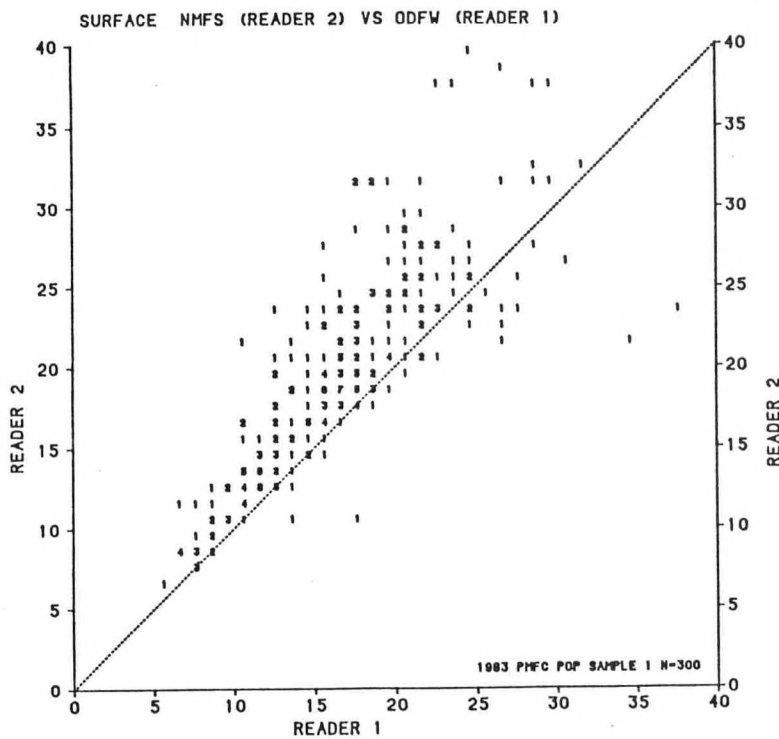
Figure 1B. Interagency POP surface method



*** R VERSUS T ***

CRUISE#	B212C	DATE#	1982	SPECIES#	301		
AGE	# AGED	% AGR	CUM. %	-BIAS	+BIAS	-1 BIAS	+1 BIAS
6	1	0.0	0.0	0.0	1.0	0	1
7	3	100.0	75.0	0.0	0.0	0	0
8	9	35.3	46.2	0.0	6.0	0	4
9	3	33.3	43.8	0.0	2.0	0	2
10	8	37.5	41.7	2.0	3.0	1	3
11	7	14.3	35.5	1.0	5.0	1	1
12	21	38.1	36.5	3.0	10.0	2	5
13	14	56.3	41.2	0.0	7.0	0	2
14	10	40.0	41.0	2.0	4.0	1	3
15	8	25.0	39.5	2.0	4.0	2	1
16	15	40.0	39.6	4.0	5.0	1	5
17	14	28.6	38.3	5.0	5.0	2	2
18	25	40.0	38.6	8.0	2.0	7	5
19	19	31.6	37.7	7.0	6.0	1	3
20	21	23.8	36.1	13.0	3.0	2	2
21	12	0.0	33.9	9.0	3.0	3	1
22	11	18.2	33.0	6.0	3.0	0	2
23	20	15.0	31.4	16.0	1.0	0	1
24	11	18.2	30.8	7.0	2.0	1	1
25	10	0.0	29.5	9.0	1.0	2	0
26	6	16.7	29.2	5.0	0.0	0	0
27	8	12.5	28.7	7.0	0.0	2	0
28	5	0.0	28.1	4.0	1.0	0	1
29	2	0.0	27.9	2.0	0.0	0	0
31	9	0.0	27.0	6.0	3.0	0	3
32	2	0.0	26.3	2.0	0.0	0	0
37	4	0.0	26.4	3.0	1.0	1	0
38	1	0.0	26.3	1.0	0.0	0	0
39	1	0.0	26.2	1.0	0.0	0	0
43	1	100.0	26.5	0.0	0.0	0	0
46	1	0.0	26.4	1.0	0.0	0	0

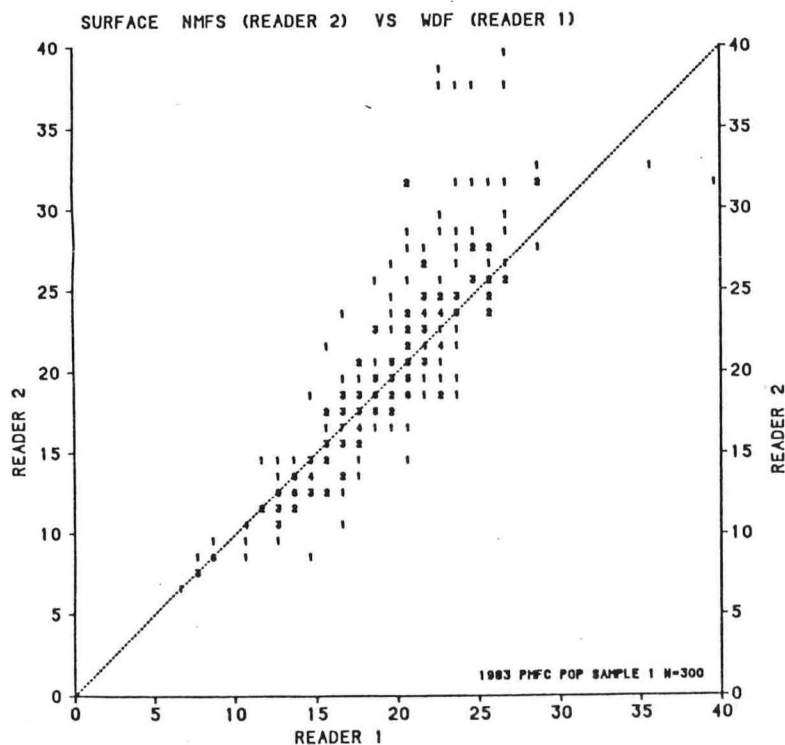
PERCENT AGREEMENT = 26.4 [75 TESTS]
 PERCENT PLUS BIAS = 29.2 [83 TESTS]
 PERCENT MINUS BIAS = 44.4 [126 TESTS]
 TOTAL SAMPLE SIZE = 300
 TOTAL NUMBER VALID COMPARISONS = 284
 TOTAL NUMBER READER AND TESTER UNABLE TO AGE = 0
 TOTAL NUMBER TESTER UNABLE TO AGE = 1
 TOTAL NUMBER READER UNABLE TO AGE = 15



*** R VERSUS T ***

CRUISE#	B2020	DATE#	1982	SPECIES#	301		
AGE	# AGED	% AGR	CUM. %	-BIAS	+BIAS	-1 BIAS	+1 BIAS
6	1	0.0	0.0	0.0	1.0	0	1
7	3	100.0	75.0	0.0	0.0	0	0
8	9	22.2	36.5	0.0	7.0	0	3
9	3	0.0	31.3	0.0	3.0	0	2
10	8	12.5	25.0	2.0	5.0	0	3
11	7	0.0	19.4	0.0	7.0	0	4
12	21	23.8	21.2	1.0	15.0	1	8
13	16	6.3	17.6	0.0	15.0	0	2
14	10	20.0	17.9	1.0	7.0	1	1
15	8	12.5	17.4	1.0	7.0	0	1
16	15	6.7	15.8	0.0	14.0	0	4
17	14	28.6	17.4	1.0	9.0	1	3
18	25	12.0	16.4	1.0	21.0	1	5
19	19	0.0	14.5	1.0	18.0	1	3
20	20	5.0	13.4	3.0	16.0	2	4
21	12	0.0	12.6	2.0	10.0	0	1
22	11	0.0	11.9	2.0	9.0	0	2
23	20	0.0	10.8	5.0	15.0	2	3
24	11	0.0	10.3	1.0	10.0	1	1
25	10	0.0	9.9	1.0	9.0	0	2
26	6	0.0	9.5	1.0	5.0	0	0
27	8	0.0	9.1	1.0	7.0	1	0
28	5	0.0	9.2	0.0	5.0	0	0
29	2	0.0	9.1	0.0	2.0	0	0
31	9	0.0	8.8	0.0	9.0	0	0
32	2	0.0	8.7	0.0	2.0	0	1
37	4	0.0	8.6	0.0	4.0	0	0
38	1	0.0	8.5	0.0	1.0	0	0
39	1	0.0	8.5	0.0	1.0	0	0
46	1	0.0	8.5	0.0	1.0	0	0

PERCENT AGREEMENT = 8.5 [24 TESTS]
 PERCENT PLUS BIAS = 83.3 [235 TESTS]
 PERCENT MINUS BIAS = 8.2 [23 TESTS]
 TOTAL SAMPLE SIZE = 100
 TOTAL NUMBER VALID COMPARISONS = 202
 TOTAL NUMBER READER AND TESTER UNABLE TO AGE = 5
 TOTAL NUMBER TESTER UNABLE TO AGE = 13
 TOTAL NUMBER READER UNABLE TO AGE = 15

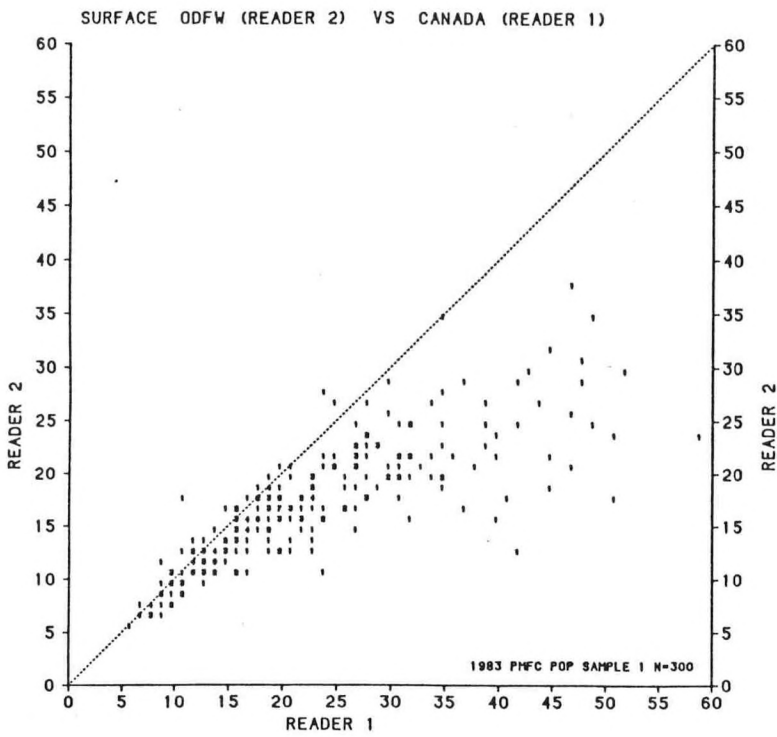


*** R VERSUS T ***

CRUISE#	B212W	DATE#	1982	SPECIES#	301		
AGE	# AGED	% AGR	CUM. %	-BIAS	+BIAS	-1 BIAS	+1 BIAS
6	1	100.0	100.0	0.0	0.0	0	0
7	3	100.0	100.0	0.0	0.0	0	0
8	9	66.7	76.9	2.0	1.0	0	1
9	3	0.0	62.5	2.0	1.0	1	1
10	8	50.0	58.3	4.0	0.0	0	0
11	7	28.6	51.6	5.0	0.0	3	0
12	21	42.9	48.1	12.0	0.0	6	0
13	16	50.0	48.5	7.0	1.0	4	1
14	10	30.0	46.2	4.0	3.0	2	1
15	8	37.5	45.3	5.0	0.0	3	0
16	15	46.7	45.5	7.0	1.0	4	1
17	14	20.0	42.2	7.0	5.0	5	3
18	25	24.0	39.0	12.0	7.0	2	3
19	19	15.8	36.2	9.0	7.0	6	5
20	20	40.0	36.7	4.0	8.0	3	5
21	12	33.3	36.5	5.0	3.0	4	2
22	11	9.1	35.0	1.0	9.0	1	3
23	20	30.0	34.5	2.0	12.0	0	4
24	11	0.0	32.9	2.0	9.0	2	3
25	10	20.0	32.4	2.0	6.0	2	3
26	6	16.7	32.0	0.0	9.0	0	1
27	8	0.0	31.0	1.0	7.0	1	0
28	5	0.0	30.4	0.0	5.0	0	0
29	2	0.0	30.2	0.0	2.0	0	0
31	9	0.0	29.2	1.0	8.0	0	0
32	2	0.0	29.0	1.0	1.0	0	0
37	4	0.0	28.6	0.0	4.0	0	0
38	1	0.0	28.3	0.0	1.0	0	0
39	1	0.0	28.4	0.0	1.0	0	0
43	1	0.0	28.3	0.0	1.0	0	0
46	1	0.0	28.2	0.0	1.0	0	0

PERCENT AGREEMENT = 28.2 [80 TESTS]
 PERCENT PLUS BIAS = 38.4 [109 TESTS]
 PERCENT MINUS BIAS = 33.5 [95 TESTS]
 TOTAL SAMPLE SIZE = 300
 TOTAL NUMBER VALID COMPARISONS = 284
 TOTAL NUMBER READER AND TESTER UNABLE TO AGE = 0
 TOTAL NUMBER TESTER UNABLE TO AGE = 1
 TOTAL NUMBER READER UNABLE TO AGE = 15

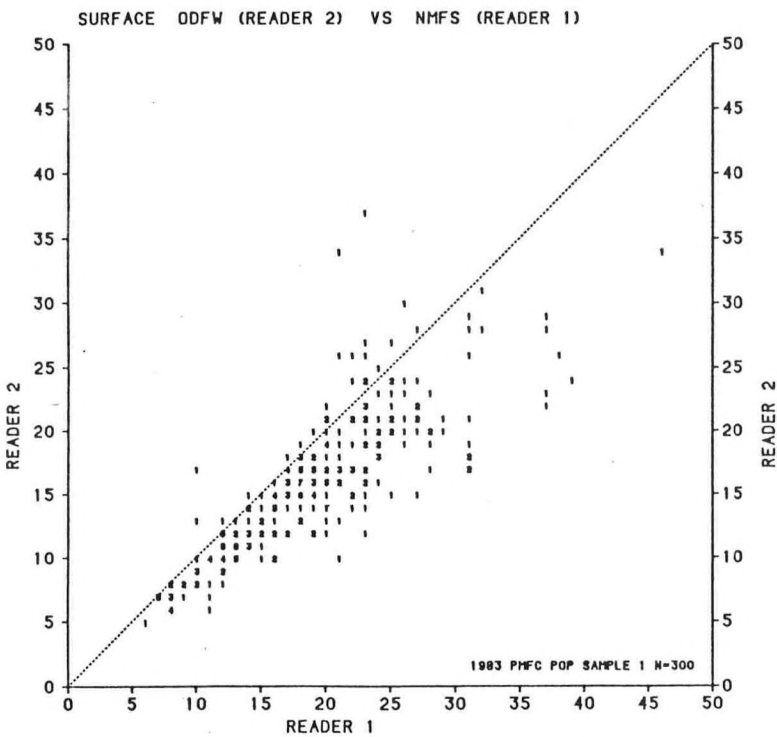
Figure 1C. Interagency POP surface method



*** R VERSUS T ***

CRUISE#	DATE#	SPECIES#					
8200C	1982	301					
AGE	# AGED	% AGR	CUM.#	-BIAS	+BIAS	-1 BIAS	+1 BIAS
5	1	100.0	100.0	0.0	0.0	0	0
6	5	20.0	33.3	4.0	0.0	3	0
7	8	50.0	42.9	3.0	1.0	1	1
8	8	62.5	50.0	3.0	0.0	1	0
9	7	28.6	44.8	4.0	1.0	3	1
10	18	5.6	29.8	14.0	3.0	5	3
11	20	20.0	26.9	15.0	1.0	5	0
12	21	14.3	23.9	15.0	3.0	4	2
13	11	0.0	21.2	9.0	2.0	2	1
14	14	0.0	18.6	13.0	1.0	3	1
15	25	12.0	17.4	22.0	0.0	4	0
16	24	0.0	14.8	21.0	3.0	1	2
17	27	7.4	13.8	23.0	2.0	3	1
18	14	28.6	14.8	9.0	1.0	1	1
19	15	0.0	13.8	14.0	1.0	1	1
20	13	7.7	13.4	11.0	1.0	0	1
21	14	0.0	12.7	14.0	0.0	0	0
22	8	0.0	12.3	8.0	0.0	0	0
23	5	0.0	12.0	5.0	0.0	0	0
24	8	0.0	11.7	8.0	0.0	0	0
25	2	0.0	11.6	2.0	0.0	0	0
26	5	0.0	11.4	4.0	1.0	1	0
27	2	0.0	11.3	1.0	1.0	0	0
28	4	0.0	11.1	4.0	0.0	1	0
29	2	0.0	11.0	2.0	0.0	0	0
30	1	0.0	11.0	1.0	0.0	0	0
31	1	0.0	11.0	1.0	0.0	0	0
34	2	50.0	11.2	1.0	0.0	0	0
37	1	0.0	11.2	1.0	0.0	0	0

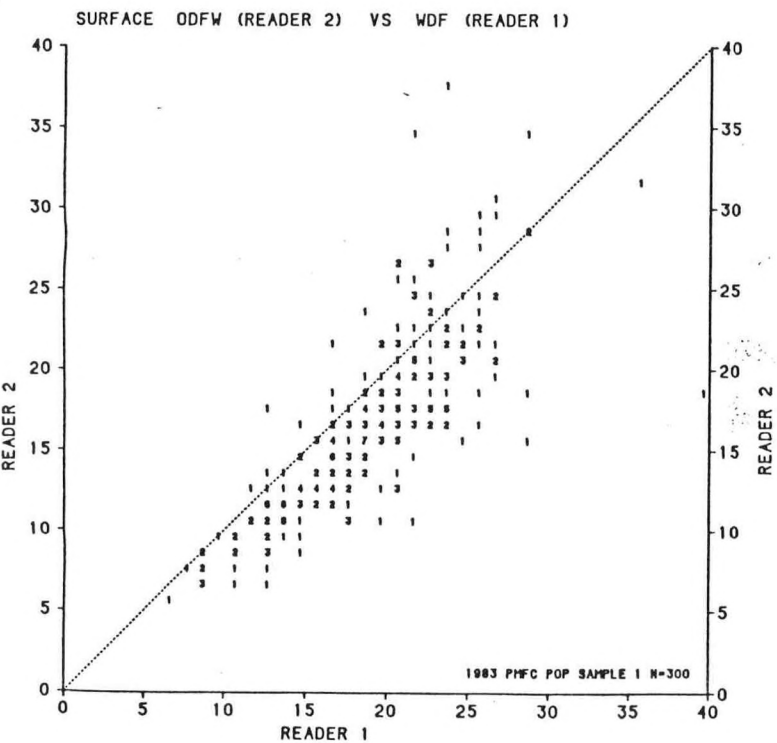
PERCENT AGREEMENT = 11.2 [32 TESTS]
 PERCENT PLUS BIAS = 7.7 [28 TESTS]
 PERCENT MINUS BIAS = 81.1 [232 TESTS]
 TOTAL SAMPLE SIZE = 300
 TOTAL NUMBER VALID COMPARISONS = 286
 TOTAL NUMBER READER AND TESTER UNABLE TO AGE = 0
 TOTAL NUMBER TESTER UNABLE TO AGE = 1
 TOTAL NUMBER READER UNABLE TO AGE = 13



*** R VERSUS T ***

CRUISE#	DATE#	SPECIES#					
3226H	1982	301					
AGE	# AGED	% AGR	CUM.#	-BIAS	+BIAS	-1 BIAS	+1 BIAS
5	1	0.0	0.0	1.0	0.0	1	0
6	5	0.0	0.0	5.0	0.0	0	0
7	8	37.5	21.4	5.0	0.0	3	0
8	8	25.0	22.7	6.0	0.0	2	0
9	5	0.0	18.5	5.0	0.0	3	0
10	18	5.6	15.3	17.0	0.0	4	0
11	20	0.0	9.2	20.0	0.0	8	0
12	20	25.0	12.9	15.0	0.0	2	0
13	11	9.1	12.5	5.0	2.0	1	1
14	14	14.3	12.7	12.0	0.0	1	0
15	25	4.0	11.1	23.0	1.0	4	1
16	24	4.2	10.1	21.0	0.0	3	0
17	28	14.3	10.7	21.0	1.0	5	0
18	14	21.4	11.4	10.0	1.0	3	1
19	14	0.0	10.7	13.0	1.0	4	1
20	13	7.7	10.5	11.0	1.0	1	1
21	14	0.0	9.9	12.0	2.0	2	2
22	8	0.0	9.6	7.0	1.0	3	0
23	5	0.0	9.4	5.0	0.0	1	0
24	8	0.0	9.1	5.0	3.0	2	2
25	1	0.0	9.1	0.0	1.0	0	1
26	5	0.0	8.9	2.0	3.0	0	0
27	2	0.0	8.9	0.0	2.0	0	0
28	4	0.0	8.7	3.0	1.0	0	1
29	2	0.0	8.7	2.0	0.0	0	0
30	1	0.0	8.6	0.0	1.0	0	0
31	1	0.0	8.6	1.0	0.0	1	0
34	2	0.0	8.5	1.0	1.0	0	0
37	1	0.0	8.5	0.0	1.0	0	0

PERCENT AGREEMENT = 8.5 [24 TESTS]
 PERCENT PLUS BIAS = 5.2 [23 TESTS]
 PERCENT MINUS BIAS = 53.3 [235 TESTS]
 TOTAL NUMBER COMPARISONS = 282
 TOTAL NUMBER UNABLE TO AGE = 23

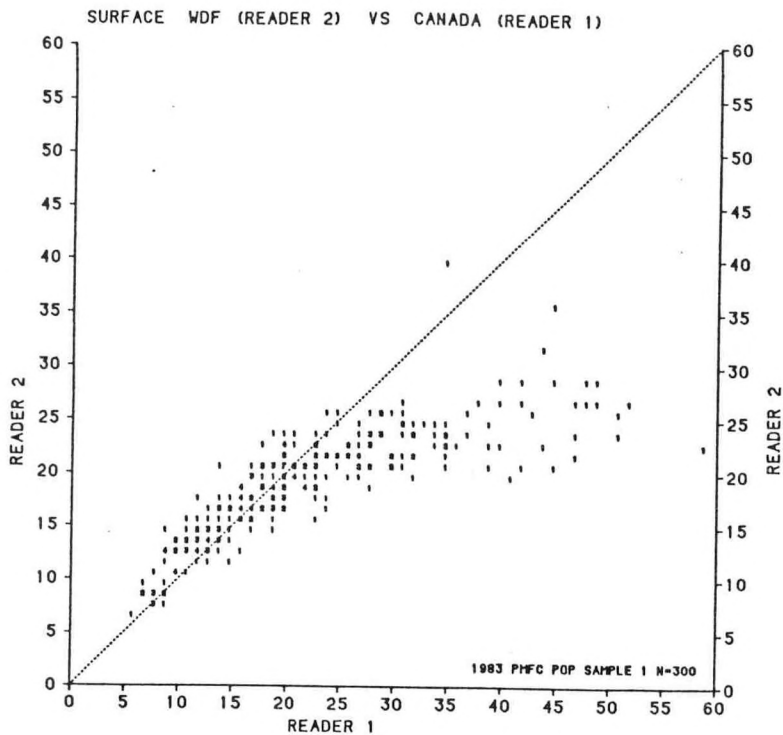


*** R VERSUS T ***

CRUISE#	DATE#	SPECIES#					
922hJ	1982	301					
AGE	# AGED	% AGR	CUM.#	-BIAS	+BIAS	-1 BIAS	+1 BIAS
6	1	0.0	0.0	0.0	1.0	0	1
7	4	100.0	80.0	0.0	0.0	0	0
8	7	28.6	50.0	0.0	5.0	0	2
9	1	100.0	53.8	0.0	0.0	0	0
10	5	0.0	36.8	0.0	6.0	0	2
11	1	0.0	31.3	1.0	2.0	1	2
12	18	5.6	20.3	2.0	15.0	1	6
13	17	5.9	15.8	0.0	16.0	0	1
14	13	15.4	15.7	1.0	10.0	0	0
15	11	27.3	17.3	0.0	8.0	0	0
16	23	8.7	15.4	3.0	18.0	1	4
17	16	6.3	14.2	0.0	15.0	0	3
18	22	9.1	13.4	2.0	18.0	1	4
19	17	5.9	12.6	2.0	14.0	0	2
20	33	3.0	10.9	7.0	25.0	3	4
21	22	4.5	10.3	6.0	15.0	1	3
22	20	5.0	9.3	6.0	13.0	2	1
23	19	5.3	9.5	3.0	15.0	0	2
24	8	12.5	9.6	0.0	7.0	0	0
25	10	0.0	9.2	3.0	7.0	0	1
26	8	0.0	9.3	2.0	6.0	0	0
28	5	40.0	9.5	1.0	2.0	0	0
35	1	0.0	9.5	0.0	1.0	0	0
39	1	0.0	9.4	0.0	1.0	0	0

PERCENT AGREEMENT = 7.4 [27 TESTS]
 PERCENT PLUS BIAS = 76.9 [220 TESTS]
 PERCENT MINUS BIAS = 13.6 [39 TESTS]
 TOTAL NUMBER COMPARISONS = 286
 TOTAL NUMBER UNABLE TO AGE = 14

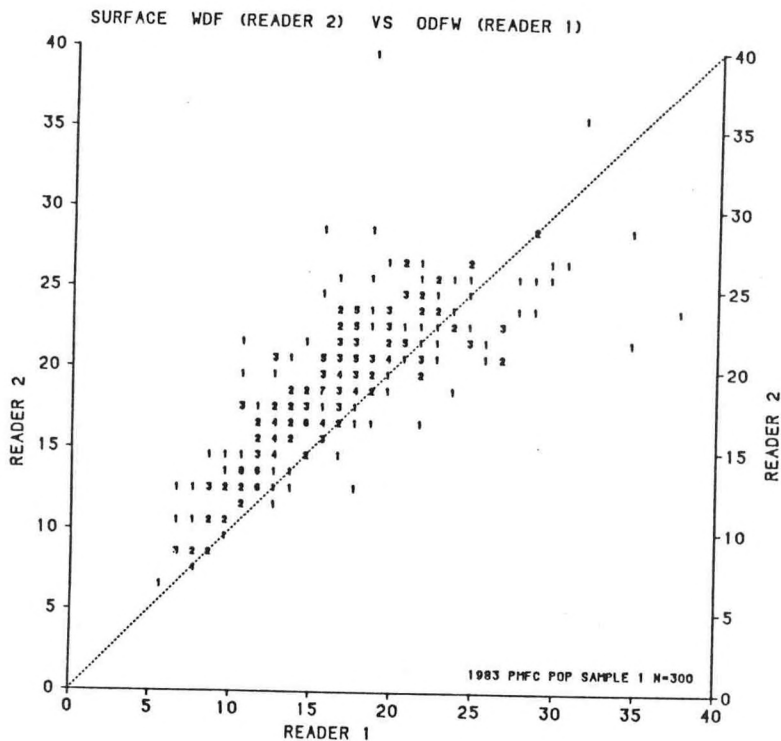
Figure 1D. Interagency POP surface method



*** R VERSUS I ***

CRUISE#	0214C	DATE#	1982	SPECIES#	301						
AGE	#	AGED	%	AGR	CUM. %	-BIAS	+BIAS	-1	BIAS	+1	BIAS
6	1	0.0	0.0	0.0	1.0	0	0	1			
7	4	75.0	60.0	1.0	0.0	1	0	1	0		
8	7	28.6	41.7	0.0	5.0	0	0	3			
9	2	0.0	35.7	0.0	2.0	0	0	1			
10	6	15.7	30.0	0.0	5.0	0	0	4			
11	4	25.0	29.2	2.0	1.0	1	0	1	0		
12	18	16.7	23.8	2.0	13.0	1	4	1	4		
13	17	29.4	25.4	1.0	11.0	1	4	1	4		
14	13	7.7	22.2	2.0	10.0	0	3	1	3		
15	11	18.2	21.7	4.0	5.0	2	1	2	1		
16	24	15.7	20.6	0.0	12.0	2	4	2	4		
17	16	0.0	17.9	7.0	9.0	2	2	2	2		
18	22	18.2	17.9	9.0	9.0	2	5	2	5		
19	18	11.1	17.2	11.0	5.0	4	1	4	1		
20	34	5.9	15.2	18.0	14.0	2	7	2	7		
21	23	0.0	13.6	21.0	2.0	2	0	2	0		
22	22	9.1	13.2	14.0	6.0	0	0	0	0		
23	21	4.8	12.5	16.0	4.0	0	1	0	1		
24	9	11.1	12.5	8.0	0.0	0	0	0	0		
25	10	0.0	12.1	8.0	2.0	0	1	0	1		
26	8	0.0	11.7	8.0	0.0	0	0	0	0		
28	5	0.0	11.5	5.0	0.0	0	0	0	0		
31	1	0.0	11.3	1.0	0.0	0	0	0	0		
35	1	0.0	11.4	1.0	0.0	0	0	0	0		
39	1	0.0	11.4	0.0	1.0	0	0	0	0		

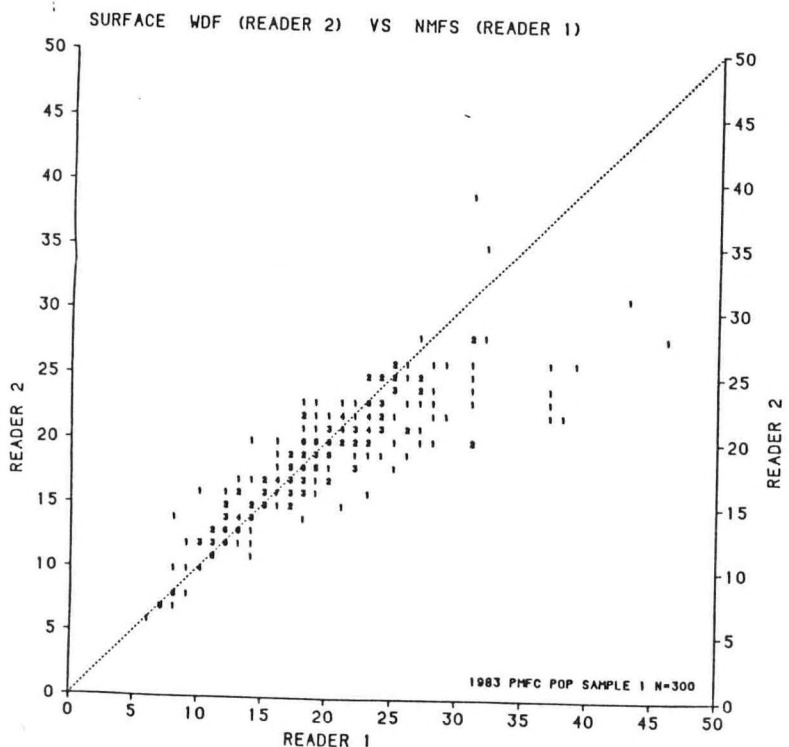
PERCENT AGREEMENT = 11.4 (34 TESTS)
 PERCENT PLUS BIAS = 39.3 (117 TESTS)
 PERCENT MINUS BIAS = 49.3 (147 TESTS)
 TOTAL SAMPLE SIZE = 300
 TOTAL NUMBER VALID COMPARISONS = 298
 TOTAL NUMBER READER AND TESTER UNABLE TO AGE = 0
 TOTAL NUMBER TESTER UNABLE TO AGE = 1
 TOTAL NUMBER READER UNABLE TO AGE = 1



*** R VERSUS I ***

CRUISE#	0214D	DATE#	1982	SPECIES#	301						
AGE	#	AGED	%	AGR	CUM. %	-BIAS	+BIAS	-1	BIAS	+1	BIAS
6	1	0.0	0.0	0.0	1.0	0	0	1			
7	4	100.0	80.0	0.0	0.0	0	0	0	0		
8	7	28.6	50.0	0.0	5.0	0	0	0	0		
9	1	100.0	53.8	0.0	6.0	0	0	0	0		
10	6	0.0	36.8	0.0	2.0	1	2	1	2		
11	3	0.0	31.8	1.0	2.0	1	2	1	2		
12	18	5.6	20.0	2.0	15.0	1	6	1	6		
13	17	5.9	15.8	0.0	16.0	0	1	0	1		
14	13	15.4	15.7	1.0	10.0	0	0	0	0		
15	11	27.3	17.3	0.0	8.0	0	0	0	0		
16	23	8.7	15.4	3.0	18.0	1	4	1	4		
17	16	6.3	14.2	0.0	15.0	0	3	0	3		
18	22	9.1	13.4	2.0	18.0	1	4	1	4		
19	17	5.9	12.6	2.0	14.0	0	2	0	2		
20	33	3.0	10.9	7.0	25.0	3	4	3	4		
21	22	4.5	10.3	6.0	15.0	1	5	1	5		
22	20	5.0	9.0	6.0	13.0	2	1	2	1		
23	19	5.3	9.5	1.0	15.0	0	2	0	2		
24	8	12.5	9.6	0.0	7.0	0	1	0	1		
25	10	0.0	9.2	3.0	7.0	0	1	0	1		
26	8	0.0	9.0	2.0	6.0	0	0	0	0		
28	5	40.0	9.5	1.0	2.0	0	0	0	0		
35	1	0.0	9.5	0.0	1.0	0	0	0	0		
39	1	0.0	9.4	0.0	1.0	0	0	0	0		

PERCENT AGREEMENT = 9.4 (27 TESTS)
 PERCENT PLUS BIAS = 76.9 (220 TESTS)
 PERCENT MINUS BIAS = 13.6 (39 TESTS)
 TOTAL SAMPLE SIZE = 300
 TOTAL NUMBER VALID COMPARISONS = 286
 TOTAL NUMBER READER AND TESTER UNABLE TO AGE = 0
 TOTAL NUMBER TESTER UNABLE TO AGE = 13
 TOTAL NUMBER READER UNABLE TO AGE = 1

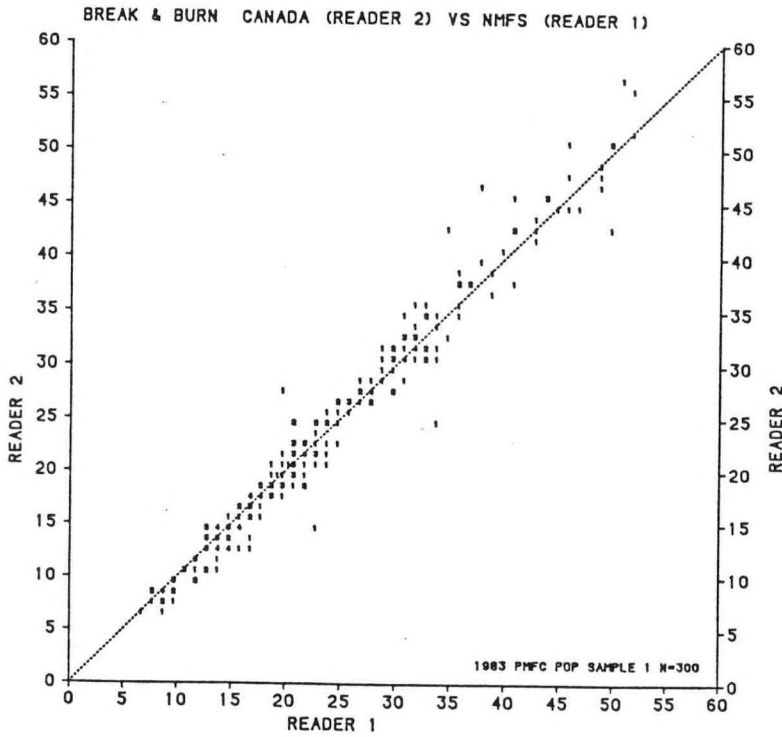


*** R VERSUS I ***

CRUISE#	0224N	DATE#	1982	SPECIES#	301						
AGE	#	AGED	%	AGR	CUM. %	-BIAS	+BIAS	-1	BIAS	+1	BIAS
6	1	100.0	100.0	0.0	0.0	0	0	0	0		
7	4	75.0	80.0	1.0	0.0	1	0	1	0		
8	7	85.7	83.3	1.0	0.0	1	0	1	0		
10	6	66.7	77.8	0.0	2.0	0	1	0	1		
11	3	66.7	76.2	1.0	0.0	0	0	0	0		
12	18	50.0	64.1	2.0	7.0	1	3	1	3		
13	17	47.1	52.9	1.0	5.0	1	6	1	6		
14	12	25.0	52.9	1.0	8.0	0	4	0	4		
15	11	27.3	49.4	4.0	4.0	1	2	1	2		
16	22	31.8	45.5	8.0	7.0	3	3	3	3		
17	17	37.6	41.5	6.0	8.0	3	4	3	4		
18	22	27.3	39.3	10.0	6.0	5	5	5	5		
19	17	37.6	35.9	9.0	5.0	5	2	5	2		
20	33	24.2	34.7	11.0	14.0	2	8	2	8		
21	22	15.2	33.0	13.0	5.0	3	3	3	3		
22	20	5.0	30.6	11.0	8.0	4	4	4	4		
23	18	33.3	30.8	5.0	4.0	3	1	3	1		
24	8	0.0	29.8	6.0	0.0	3	0	3	0		
25	18	20.0	29.5	4.0	4.0	1	2	1	2		
26	8	12.5	29.0	5.0	2.0	0	2	0	2		
28	5	0.0	25.5	5.0	2.0	0	2	0	2		
31	1	0.0	26.4	1.0	0.0	0	0	0	0		
35	1	0.0	26.3	0.0	1.0	0	0	0	0		
39	1	0.0	28.2	0.0	1.0	0	0	0	0		

PERCENT AGREEMENT = 28.2 (80 TESTS)
 PERCENT PLUS BIAS = 33.5 (95 TESTS)
 PERCENT MINUS BIAS = 32.4 (109 TESTS)
 TOTAL NUMBER COMPARISONS = 284
 TOTAL NUMBER UNABLE TO AGE = 16

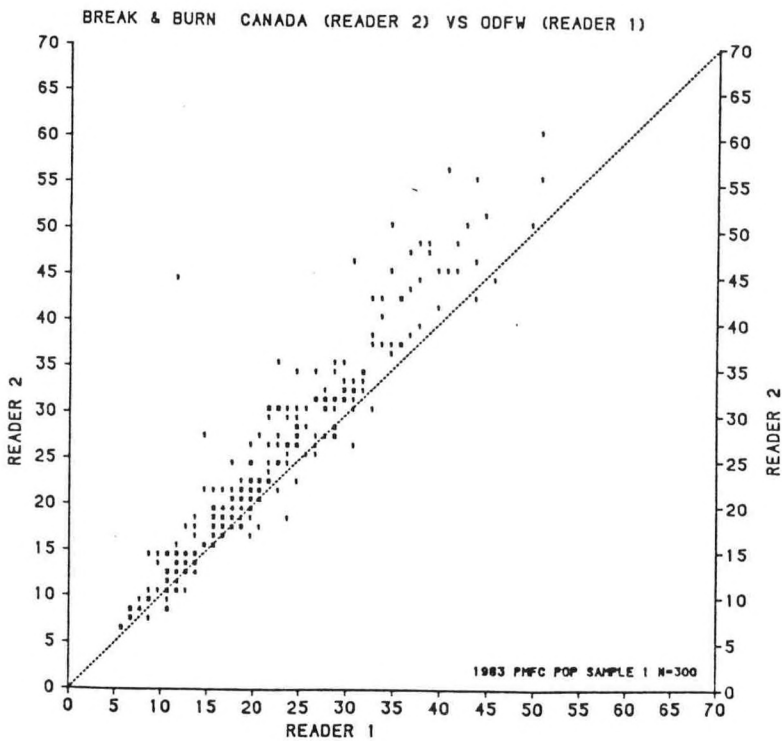
Figure 2A. Interagency POP break-and burn method



*** R VERSUS T ***

CRUISE# 821CZ		DATE# 1982		SPECIES# 301			
AGE	# AGED	I AGR	CUM-X	-BIAS	+BIAS -1	BIAS +1	BIAS
6	2	50.0	50.0	1.0	0.0	0	0
7	4	25.0	35.3	1.0	0.0	2	0
8	8	50.0	42.9	2.0	2.0	2	2
9	5	60.0	47.4	2.0	0.0	0	0
10	7	42.9	46.2	4.0	0.0	1	0
11	7	85.7	54.5	1.0	0.0	0	0
12	19	47.4	51.9	10.0	0.0	4	0
13	14	42.9	50.0	1.0	4.0	2	5
14	16	31.3	46.3	5.0	6.0	4	4
15	5	20.0	44.8	3.0	1.0	2	1
16	6	50.0	45.2	1.0	2.0	1	2
17	14	28.6	43.0	6.0	4.0	5	4
18	11	27.3	41.5	6.0	2.0	3	2
19	16	68.8	44.8	4.0	1.0	0	4
20	15	66.7	47.0	1.0	2.0	1	1
21	12	33.3	46.0	4.0	4.0	3	3
22	11	9.1	43.6	2.0	8.0	1	5
23	1	0.0	43.4	0.0	1.0	0	1
24	8	12.5	42.0	1.0	6.0	0	2
25	3	33.3	41.8	0.0	2.0	0	1
26	8	12.5	40.6	2.0	5.0	2	1
27	9	44.4	40.8	2.0	3.0	0	2
28	4	25.0	40.5	1.0	2.0	0	1
29	2	50.0	40.6	0.0	1.0	0	1
30	12	33.3	40.2	4.0	4.0	1	3
31	11	36.4	40.0	1.0	4.0	2	1
32	7	0.0	38.8	1.0	6.0	0	3
33	2	50.0	38.9	0.0	1.0	0	0
34	5	0.0	38.1	1.0	4.0	1	1
35	3	33.3	38.1	0.0	2.0	0	0
36	1	0.0	37.9	1.0	0.0	0	0
37	4	0.0	37.3	1.0	3.0	0	1
38	2	50.0	37.4	0.0	1.0	0	0
39	1	0.0	37.3	0.0	1.0	0	0
40	2	0.0	37.0	0.0	2.0	0	1
41	1	0.0	36.8	1.0	0.0	1	0
42	5	20.0	36.5	1.0	3.0	0	0
43	1	0.0	36.4	0.0	1.0	0	1
44	3	33.3	36.3	2.0	0.0	1	0
45	4	0.0	35.8	0.0	4.0	0	0
46	2	0.0	35.5	1.0	1.0	0	0
47	2	0.0	35.3	1.0	1.0	1	0
48	1	100.0	35.5	0.0	0.0	0	0
50	3	0.0	35.1	0.0	3.0	0	2
51	1	100.0	35.4	0.0	0.0	0	0
55	1	0.0	35.2	0.0	1.0	0	0
56	1	0.0	35.1	0.0	1.0	0	0
60	1	0.0	35.0	0.0	1.0	0	0

PERCENT AGREEMENT = 35.0 [99 TESTS]
 PERCENT PLUS BIAS = 35.7 [101 TESTS]
 PERCENT MINUS BIAS = 29.3 [83 TESTS]
 TOTAL NUMBER COMPARISONS = 283
 TOTAL NUMBER UNABLE TO AGE = 17

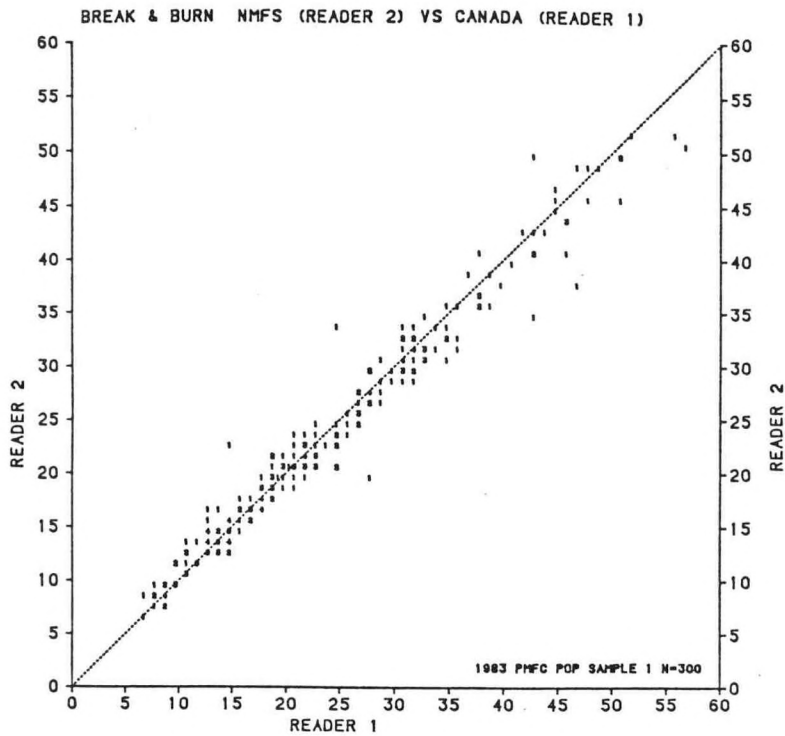


*** R VERSUS T ***

CRUISE# 820C0		DATE# 1982		SPECIES# 301			
AGE	# AGED	I AGR	CUM-X	-BIAS	+BIAS -1	BIAS +1	BIAS
6	2	0.0	0.0	0.0	2.0	0	2
7	4	0.0	0.0	1.0	3.0	1	3
8	8	0.0	0.0	2.0	6.0	0	4
9	5	0.0	0.0	1.0	4.0	1	3
10	7	28.6	7.7	3.0	2.0	2	1
11	7	57.1	18.2	0.0	3.0	0	3
12	19	15.8	17.3	4.0	12.0	4	9
13	14	21.4	18.2	0.0	11.0	0	2
14	16	0.0	14.6	0.0	16.0	0	3
15	5	40.0	16.1	0.0	3.0	0	2
16	8	37.5	17.9	1.0	4.0	0	3
17	14	14.3	17.4	4.0	8.0	3	3
18	11	9.1	16.7	2.0	8.0	1	2
19	16	12.5	16.2	0.0	14.0	0	4
20	15	13.3	15.9	0.0	13.0	0	5
21	12	0.0	14.7	1.0	11.0	1	2
22	12	0.0	13.7	1.0	11.0	0	2
23	1	0.0	13.6	0.0	1.0	0	0
24	8	0.0	13.0	0.0	8.0	0	1
25	3	33.3	13.4	1.0	1.0	1	0
26	9	11.1	13.3	1.0	7.0	0	0
27	9	11.1	13.2	2.0	6.0	0	0
28	5	40.0	13.8	0.0	3.0	0	0
29	3	0.0	13.6	0.0	3.0	0	0
30	12	8.3	13.3	1.0	10.0	0	0
31	12	0.0	12.7	0.0	12.0	0	1
32	7	0.0	12.3	0.0	7.0	0	1
33	3	0.0	12.1	0.0	3.0	0	0
34	5	0.0	11.9	0.0	5.0	0	0
35	3	0.0	11.8	0.0	3.0	0	0
36	1	0.0	11.7	0.0	1.0	0	0
37	5	0.0	11.5	0.0	5.0	0	0
38	2	0.0	11.4	0.0	2.0	0	0
39	1	0.0	11.4	0.0	1.0	0	0
40	2	0.0	11.3	0.0	2.0	0	0
41	1	0.0	11.2	0.0	1.0	0	0
42	5	0.0	11.0	1.0	4.0	1	0
43	1	0.0	11.0	0.0	1.0	0	0
44	3	0.0	10.9	1.0	2.0	1	0
45	4	0.0	10.7	0.0	4.0	0	0
46	2	0.0	10.6	0.0	2.0	0	0
47	2	0.0	10.6	0.0	2.0	0	0
48	3	0.0	10.5	0.0	3.0	0	0
50	3	0.0	10.3	0.0	3.0	0	1
51	1	0.0	10.3	0.0	1.0	0	0
55	2	0.0	10.2	0.0	2.0	0	0
56	1	0.0	10.2	0.0	1.0	0	0
60	1	0.0	10.2	0.0	1.0	0	0
70	1	0.0	10.1	0.0	1.0	0	0

PERCENT AGREEMENT = 10.1 [30 TESTS]
 PERCENT PLUS BIAS = 80.7 [239 TESTS]
 PERCENT MINUS BIAS = 9.1 [27 TESTS]
 TOTAL SAMPLE SIZE = 300
 TOTAL NUMBER VALID COMPARISONS = 296
 TOTAL NUMBER READER AND TESTER UNABLE TO AGE = 1
 TOTAL NUMBER TESTER UNABLE TO AGE = 4
 TOTAL NUMBER READER UNABLE TO AGE = 1

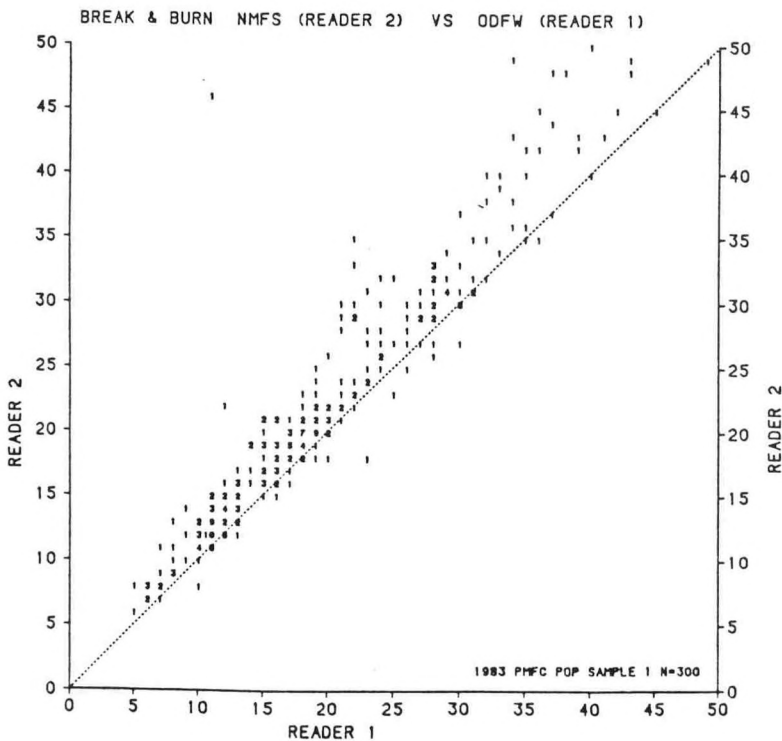
Figure 2B. Interagency POP break-and-burn method



*** R VERSUS T ***

CRUISE# 8202C		DATE# 1982		SPECIES# 301			
AGE	# AGED	I AGR	CUM-2	-BIAS	+BIAS	-1 BIAS	+1 BIAS
6	1	100.0	100.0	0.0	0.0	0	0
7	3	33.3	50.0	2.0	0.0	2	0
8	7	57.1	54.5	0.0	3.0	0	2
9	6	50.0	52.9	0.0	3.0	0	2
10	3	100.0	60.0	0.0	0.0	0	0
11	9	66.7	62.1	0.0	0.0	0	1
12	18	50.0	57.4	7.0	2.0	5	0
13	16	37.5	52.4	4.0	6.0	4	4
14	12	41.7	50.7	1.0	6.0	1	2
15	8	12.5	47.0	2.0	5.0	2	4
16	11	27.3	44.7	4.0	4.0	4	2
17	2	50.0	45.1	2.0	2.0	2	1
18	10	30.0	43.8	2.0	5.0	1	5
19	18	61.1	46.2	3.0	4.0	1	3
20	22	45.5	46.1	8.0	4.0	3	3
21	13	30.8	44.8	5.0	4.0	5	1
22	9	11.1	43.1	3.0	5.0	1	3
23	6	0.0	41.7	3.0	3.0	2	1
24	5	20.0	41.1	3.0	1.0	1	0
25	4	25.0	40.7	3.0	0.0	3	0
26	4	25.0	40.4	3.0	0.0	2	0
27	7	57.1	41.0	1.0	2.0	1	2
28	4	25.0	40.7	3.0	0.0	1	0
29	8	12.5	39.6	5.0	2.0	3	0
30	10	40.0	39.6	5.0	1.0	1	0
31	10	40.0	39.7	5.0	1.0	3	1
32	7	0.0	38.5	3.0	4.0	0	2
33	5	20.0	38.1	1.0	3.0	1	0
34	2	0.0	37.8	1.0	1.0	0	1
35	5	20.0	37.5	3.0	1.0	0	1
36	1	0.0	37.3	1.0	0.0	1	0
37	3	0.0	36.9	3.0	0.0	0	0
38	2	50.0	37.0	0.0	1.0	0	0
39	1	0.0	36.8	1.0	0.0	1	0
40	4	0.0	36.3	3.0	1.0	0	0
42	3	33.3	36.2	1.0	1.0	1	1
43	3	0.0	35.8	3.0	0.0	0	0
44	1	100.0	36.1	0.0	0.0	0	0
45	3	0.0	35.7	2.0	1.0	0	1
46	1	0.0	35.5	0.0	1.0	0	0
48	3	33.3	35.5	0.0	2.0	0	1
49	3	0.0	35.1	2.0	1.0	2	0
50	1	0.0	35.0	1.0	0.0	0	0
51	3	33.3	35.0	2.0	0.0	0	0

PERCENT AGREEMENT = 35.0 (99 TESTS)
 PERCENT PLUS BIAS = 29.3 (83 TESTS)
 PERCENT MINUS BIAS = 35.7 (101 TESTS)
 TOTAL SAMPLE SIZE = 299
 TOTAL NUMBER VALID COMPARISONS = 283
 TOTAL NUMBER READER AND TESTER UNABLE TO AGE = 0
 TOTAL NUMBER TESTER UNABLE TO AGE = 1
 TOTAL NUMBER READER UNABLE TO AGE = 16

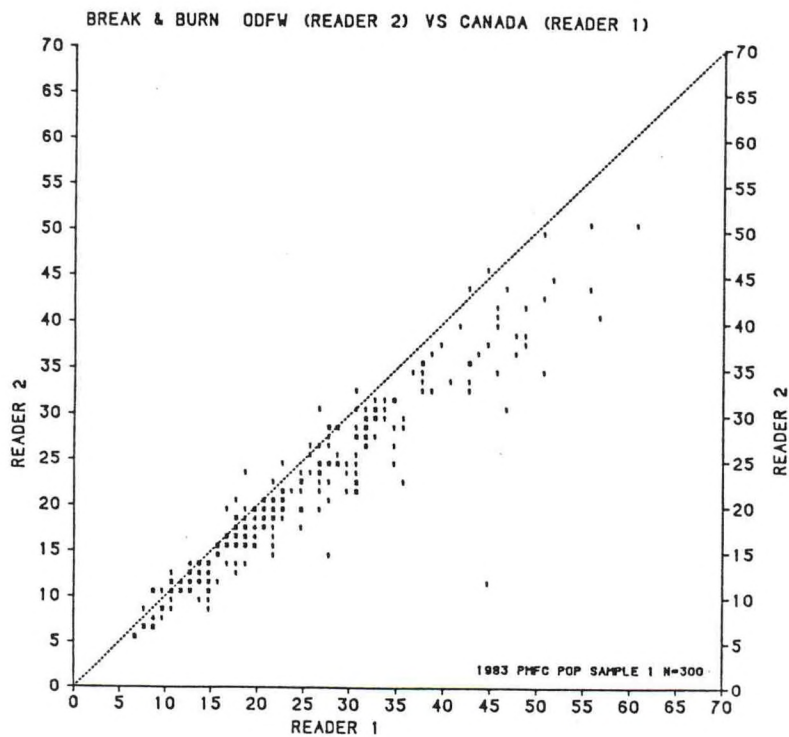


*** R VERSUS T ***

CRUISE# 8202D		DATE# 1982		SPECIES# 301			
AGE	# AGED	I AGR	CUM-2	-BIAS	+BIAS	-1 BIAS	+1 BIAS
6	1	0.0	0.0	0.0	1.0	0	1
7	3	33.3	25.0	0.0	2.0	0	2
8	7	0.0	9.1	1.0	6.0	0	2
9	6	0.0	6.7	0.0	4.0	0	3
10	3	33.3	11.1	0.0	0.0	0	1
11	9	33.3	18.5	0.0	6.0	0	4
12	18	16.7	17.8	1.0	14.0	1	10
13	16	12.5	16.4	0.0	14.0	0	2
14	11	0.0	13.9	0.0	11.0	0	3
15	8	12.5	13.8	1.0	6.0	1	0
16	11	8.2	14.5	1.0	8.0	1	3
17	8	12.5	14.1	0.0	7.0	0	3
18	10	20.0	14.7	3.0	5.0	1	2
19	18	5.6	13.4	0.0	17.0	0	4
20	22	9.1	12.8	0.0	20.0	0	9
21	13	7.7	12.3	0.0	12.0	0	3
22	9	11.1	12.3	0.0	8.0	0	2
23	6	0.0	11.9	1.0	5.0	0	2
24	5	0.0	11.5	0.0	5.0	0	2
25	4	0.0	11.3	1.0	3.0	1	1
26	4	0.0	11.1	1.0	3.0	0	0
27	7	14.3	11.2	2.0	4.0	1	1
28	4	0.0	10.9	0.0	4.0	0	0
29	8	0.0	10.5	0.0	8.0	0	0
30	10	30.0	11.4	0.0	7.0	0	0
31	10	20.0	11.8	0.0	8.0	0	1
32	7	14.3	11.9	0.0	6.0	0	1
33	5	0.0	11.6	0.0	5.0	0	0
34	2	0.0	11.5	0.0	2.0	0	1
35	2	20.0	11.7	1.0	1.0	1	0
36	1	0.0	11.6	0.0	1.0	0	1
37	3	33.3	11.9	0.0	2.0	0	0
38	2	0.0	11.8	0.0	2.0	0	0
39	1	0.0	11.8	0.0	1.0	0	0
40	4	25.0	12.0	0.0	3.0	0	0
42	3	0.0	11.8	0.0	3.0	0	0
43	3	0.0	11.7	0.0	3.0	0	0
44	1	0.0	11.7	0.0	1.0	0	0
45	3	33.3	11.9	0.0	2.0	0	0
46	1	0.0	11.9	0.0	1.0	0	0
48	3	0.0	11.7	0.0	3.0	0	0
49	3	33.3	12.0	0.0	2.0	0	0
50	1	0.0	11.9	0.0	1.0	0	0
51	3	0.0	11.8	0.0	3.0	0	2

PERCENT AGREEMENT = 11.8 (33 TESTS)
 PERCENT PLUS BIAS = 83.6 (234 TESTS)
 PERCENT MINUS BIAS = 4.6 (13 TESTS)
 TOTAL SAMPLE SIZE = 299
 TOTAL NUMBER VALID COMPARISONS = 280
 TOTAL NUMBER READER AND TESTER UNABLE TO AGE = 0
 TOTAL NUMBER TESTER UNABLE TO AGE = 6
 TOTAL NUMBER READER UNABLE TO AGE = 16

Figure 2C. Interagency POP break-and-burn method

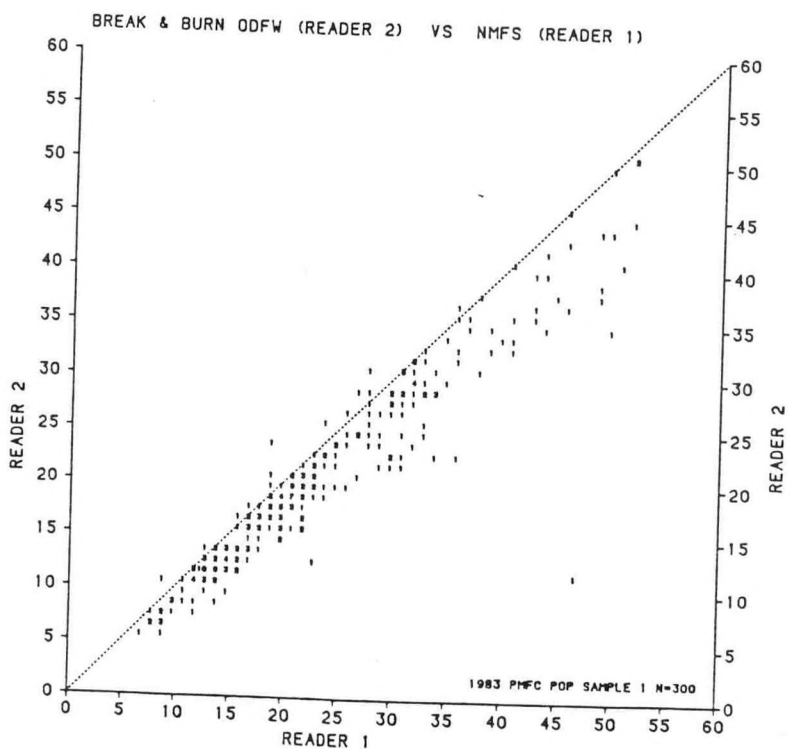


*** R VERSUS T ***

CRUISE# 821GC DATE: 1982 SPECIES# 301

AGE	# AGED	I	AGR	CUM-I	-BIAS	+BIAS	-1	BIAS	+1	BIAS
5	1	100.0	100.0	0.0	0.0	0	0	0	0	0
6	5	20.0	33.3	4.0	0.0	3	0	0	0	0
7	8	50.0	42.9	3.0	1.0	1	1	1	1	1
8	8	52.5	50.0	3.0	0.0	1	0	0	0	0
9	7	25.6	44.8	4.0	1.0	3	1	1	1	1
10	18	5.6	29.8	14.0	1.0	3	1	1	1	1
11	20	20.0	26.9	15.0	1.0	5	0	0	0	0
12	21	14.3	23.9	15.0	3.0	4	2	2	2	2
13	11	0.0	21.2	9.0	2.0	2	1	1	1	1
14	14	0.0	18.6	13.0	1.0	3	1	1	1	1
15	25	12.0	17.4	22.0	0.0	4	0	0	0	0
16	24	0.0	14.8	21.0	3.0	1	2	2	2	2
17	27	7.4	13.8	23.0	2.0	3	1	1	1	1
18	14	28.6	14.8	9.0	1.0	1	1	1	1	1
19	15	0.0	15.8	14.0	1.0	1	1	1	1	1
20	13	7.7	13.4	11.0	1.0	0	1	1	1	1
21	14	0.0	12.7	14.0	0.0	0	0	0	0	0
22	8	0.0	12.3	8.0	0.0	0	0	0	0	0
23	5	0.0	12.0	5.0	0.0	0	0	0	0	0
24	8	0.0	11.7	8.0	0.0	0	0	0	0	0
25	2	0.0	11.6	2.0	0.0	0	0	0	0	0
26	5	0.0	11.4	4.0	1.0	1	0	0	0	0
27	2	0.0	11.3	1.0	1.0	0	0	0	0	0
28	4	0.0	11.1	4.0	0.0	1	0	0	0	0
29	2	0.0	11.0	2.0	0.0	0	0	0	0	0
30	1	0.0	11.0	1.0	0.0	0	0	0	0	0
31	1	0.0	11.0	1.0	0.0	0	0	0	0	0
34	2	50.0	11.2	1.0	0.0	0	0	0	0	0
37	1	C-C	11.2	1.0	0.0	0	0	0	0	0

PERCENT AGREEMENT = 11.2 [32 TESTS]
 PERCENT PLUS BIAS = 7.7 [22 TESTS]
 PERCENT MINUS BIAS = 81.1 [232 TESTS]
 TOTAL SAMPLE SIZE = 300
 TOTAL NUMBER VALID COMPARISONS = 286
 TOTAL NUMBER READER AND TESTER UNABLE TO AGE = 0
 TOTAL NUMBER TESTER UNABLE TO AGE = 1
 TOTAL NUMBER READER UNABLE TO AGE = 13



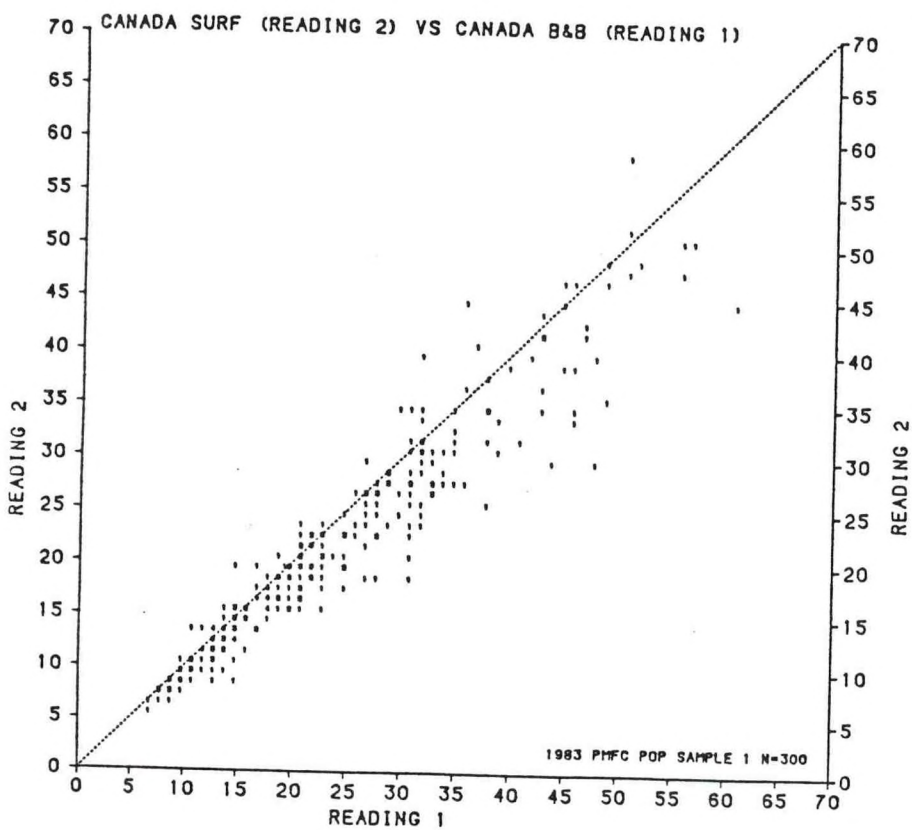
*** R VERSUS T ***

CRUISE# 8200Z DATE: 1982 SPECIES# 301

AGE	# AGED	I	AGR	CUM-I	-BIAS	+BIAS	-1	BIAS	+1	BIAS
5	2	0.0	0.0	2.0	0.0	1	0	0	0	0
6	5	0.0	0.0	5.0	0.0	2	0	0	0	0
7	5	20.0	6.3	4.0	0.0	2	0	0	0	0
8	6	0.0	5.6	6.0	0.0	3	0	0	0	0
9	3	0.0	4.8	3.0	0.0	1	0	0	0	0
10	11	9.1	6.3	9.0	1.0	4	0	0	0	0
11	28	10.7	8.3	25.0	0.0	10	0	0	0	0
12	23	23.1	11.0	10.0	0.0	2	0	0	0	0
13	12	18.7	11.8	9.0	1.0	3	1	1	1	1
14	4	0.0	11.2	4.0	0.0	0	0	0	0	0
15	13	7.7	10.8	12.0	0.0	3	0	0	0	0
16	13	15.4	11.3	10.0	1.0	3	1	1	1	1
17	13	7.7	10.9	11.0	1.0	2	1	1	1	1
18	17	11.8	11.0	15.0	0.0	4	0	0	0	0
19	18	5.6	10.4	7.0	1.0	3	0	0	0	0
20	18	20.0	11.0	16.0	1.0	9	1	1	1	1
21	8	12.5	11.0	7.0	0.0	2	0	0	0	0
22	9	11.1	11.1	8.0	0.0	2	0	0	0	0
23	7	0.0	10.7	6.0	1.0	2	0	0	0	0
24	7	0.0	10.3	7.0	0.0	1	0	0	0	0
25	3	0.0	10.1	2.0	1.0	0	0	0	0	0
26	5	0.0	9.9	4.0	1.0	1	1	1	1	1
27	5	20.0	10.1	4.0	0.0	0	0	0	0	0
28	12	0.0	9.6	10.0	2.0	2	1	1	1	1
29	6	0.0	9.4	6.0	0.0	0	0	0	0	0
30	7	42.9	10.3	3.0	1.0	1	0	0	0	0
31	4	50.0	11.0	2.0	0.0	1	0	0	0	0
32	4	25.0	11.2	3.0	0.0	0	0	0	0	0
33	3	0.0	11.1	3.0	0.0	1	0	0	0	0
34	3	0.0	10.9	3.0	0.0	0	0	0	0	0
35	4	25.0	11.2	3.0	0.0	1	0	0	0	0
36	3	0.0	11.0	2.0	1.0	0	1	1	1	1
37	1	33.3	11.3	2.0	0.0	0	0	0	0	0
38	1	0.0	11.2	2.0	0.0	0	0	0	0	0
39	2	0.0	11.2	2.0	0.0	0	0	0	0	0
40	2	50.0	11.4	1.0	0.0	0	0	0	0	0
41	1	0.0	11.4	1.0	0.0	0	0	0	0	0
42	1	0.0	11.4	1.0	0.0	0	0	0	0	0
43	2	0.0	11.3	2.0	0.0	0	0	0	0	0
44	1	0.0	11.2	1.0	0.0	0	0	0	0	0
45	1	100.0	11.6	0.0	0.0	0	0	0	0	0
49	1	100.0	11.9	0.0	0.0	0	0	0	0	0
50	2	0.0	11.8	2.0	0.0	2	0	0	0	0

PERCENT AGREEMENT = 11.8 [33 TESTS]
 PERCENT PLUS BIAS = 4.6 [13 TESTS]
 PERCENT MINUS BIAS = 83.6 [234 TESTS]
 TOTAL SAMPLE SIZE = 299
 TOTAL NUMBER VALID COMPARISONS = 290
 TOTAL NUMBER READER AND TESTER UNABLE TO AGE = 0
 TOTAL NUMBER TESTER UNABLE TO AGE = 16
 TOTAL NUMBER READER UNABLE TO AGE = 4

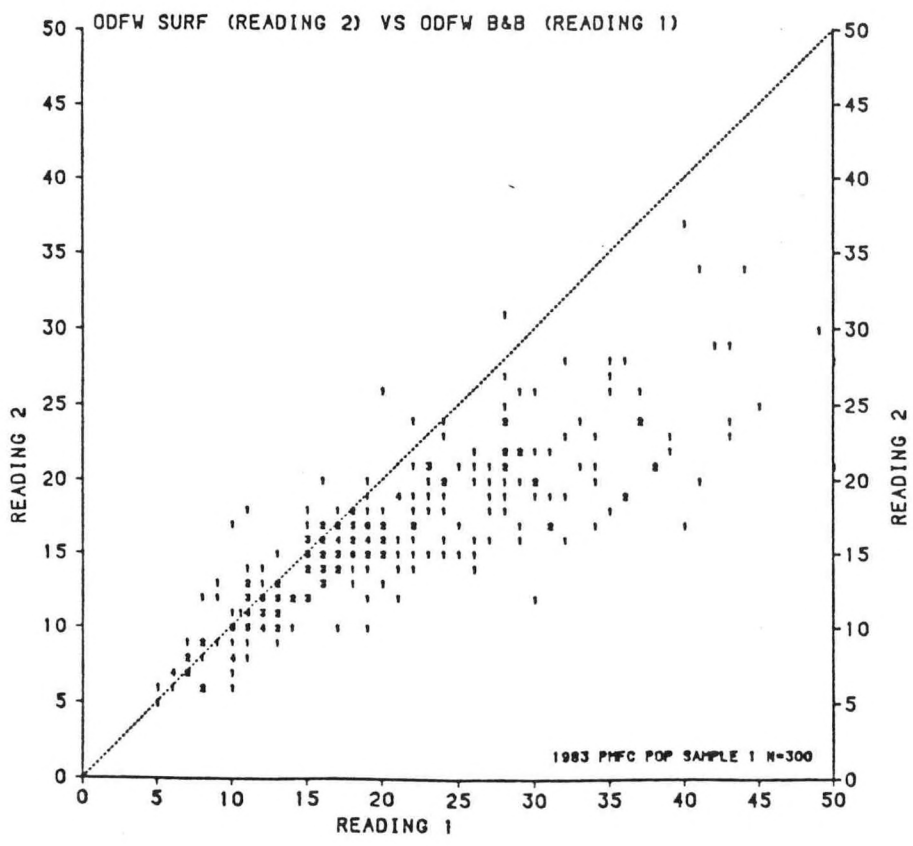
Figure.3A. Within agency POP surface vs break-and-burn



*** R VERSUS T ***

CRUISE# 0200C			DATE# 1982		SPECIES# 301			
AGE	# AGED	% AGR	CUR-1	-BIAS	+BIAS	-1 BIAS	+1 BIAS	
6	2	50.0	50.0	0.0	1.0	0	1	
7	4	75.0	66.7	0.0	1.0	0	1	
8	9	55.6	60.0	0.0	4.0	0	3	
9	6	33.3	52.4	1.0	3.0	1	2	
10	7	28.6	46.4	1.0	4.0	0	3	
11	7	57.1	48.6	1.0	2.0	0	1	
12	20	30.0	41.8	4.0	10.0	4	5	
13	14	42.9	42.0	2.0	6.0	1	3	
14	16	18.1	37.4	4.0	9.0	3	3	
15	5	40.0	37.8	0.0	3.0	0	2	
16	8	50.0	30.8	2.0	2.0	1	0	
17	14	28.6	37.5	1.0	9.0	0	4	
18	11	54.5	39.0	1.0	4.0	0	1	
19	16	62.5	41.7	0.0	6.0	0	2	
20	15	13.3	39.0	4.0	9.0	2	3	
21	12	25.0	38.0	2.0	7.0	2	0	
22	12	25.0	37.1	1.0	8.0	1	1	
23	1	0.0	36.9	0.0	1.0	0	0	
24	8	12.5	35.0	0.0	7.0	0	0	
25	3	0.0	35.3	1.0	2.0	1	0	
26	9	33.3	35.2	1.0	5.0	0	1	
27	9	11.1	34.1	0.0	8.0	0	3	
28	5	40.0	34.3	0.0	3.0	0	2	
29	3	0.0	33.8	1.0	2.0	0	0	
30	12	8.3	32.5	2.0	9.0	1	0	
31	12	16.7	31.7	3.0	7.0	0	2	
32	7	0.0	30.8	0.0	7.0	0	0	
33	3	0.0	30.4	0.0	3.0	0	0	
34	5	20.0	30.2	0.0	4.0	0	0	
35	3	0.0	29.8	2.0	1.0	1	0	
36	1	0.0	29.7	1.0	0.0	0	0	
37	5	20.0	29.5	0.0	4.0	0	0	
39	2	0.0	29.3	0.0	2.0	0	0	
40	1	0.0	29.2	0.0	1.0	0	1	
40	2	0.0	29.0	0.0	2.0	0	0	
41	1	0.0	28.9	0.0	1.0	0	0	
42	5	0.0	28.4	0.0	4.0	1	2	
43	1	0.0	28.3	1.0	1.0	0	0	
44	3	33.3	28.3	1.0	1.0	0	0	
45	4	0.0	27.9	1.0	3.0	1	0	
46	2	0.0	27.7	0.0	2.0	0	0	
47	2	0.0	27.5	0.0	2.0	0	0	
48	3	33.3	27.4	0.0	2.0	0	0	
50	3	0.0	27.3	2.0	1.0	1	0	
51	1	0.0	27.2	0.0	1.0	0	0	
55	2	0.0	27.0	0.0	2.0	0	0	
56	1	0.0	26.9	0.0	1.0	0	0	
60	1	0.0	26.8	0.0	1.0	0	0	
70	1	0.0	26.8	0.0	1.0	0	0	

PERCENT AGREEMENT = 26.8 [80 TESTS]
 PERCENT PLUS BIAS = 59.9 [179 TESTS]
 PERCENT MINUS BIAS = 13.4 [40 TESTS]
 TOTAL NUMBER COMPARISONS= 299
 TOTAL NUMBER UNABLE TO AGE= 1

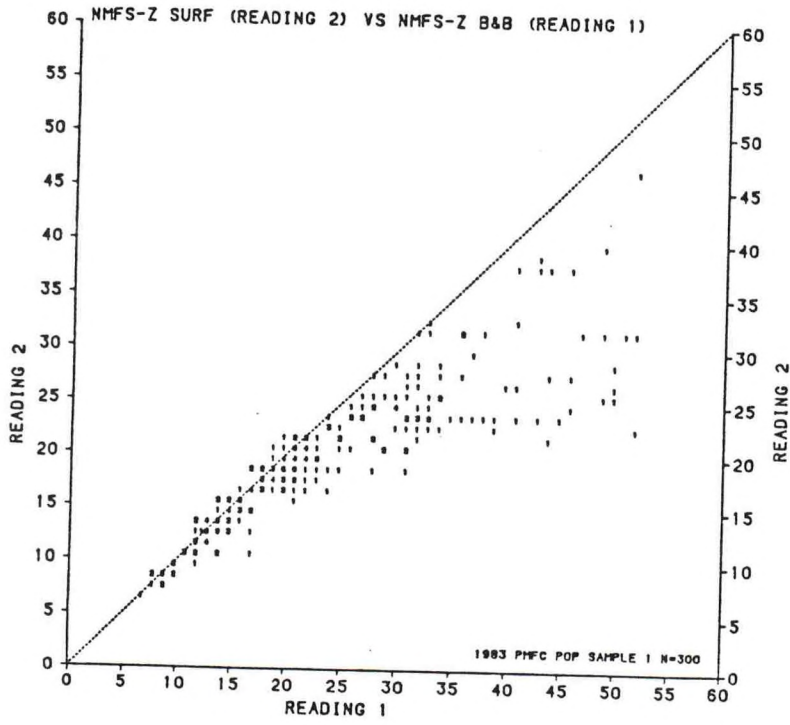


*** R VERSUS T ***

CRUISE# 02100			DATE# 1982		SPECIES# 301			
AGE	# AGED	% AGR	CUR-1	-BIAS	+BIAS	-1 BIAS	+1 BIAS	
5	1	100.0	100.0	0.0	0.0	0	0	
6	5	20.0	33.3	3.0	1.0	0	1	
7	7	28.6	30.8	1.0	4.0	0	4	
8	8	12.5	23.8	5.0	2.0	0	2	
9	7	14.3	21.4	3.0	3.0	1	2	
10	17	17.6	20.0	14.0	0.0	5	0	
11	20	70.0	35.4	5.0	1.0	3	1	
12	21	14.3	30.2	13.0	5.0	5	3	
13	11	18.2	28.9	5.0	4.0	0	1	
14	14	0.0	25.2	12.0	2.0	2	0	
15	25	12.0	22.8	21.0	1.0	2	0	
16	24	8.3	20.6	19.0	3.0	4	3	
17	27	7.4	18.7	21.0	4.0	5	2	
18	14	14.3	18.4	9.0	3.0	1	1	
19	15	6.7	17.6	14.0	0.0	0	0	
20	13	0.0	16.5	11.0	2.0	0	1	
21	14	0.0	15.6	14.0	0.0	1	0	
22	8	0.0	15.1	8.0	0.0	0	0	
23	5	0.0	15.1	8.0	0.0	0	0	
24	8	12.5	14.8	5.0	0.0	1	0	
25	2	0.0	14.7	6.0	1.0	0	0	
26	5	0.0	14.4	4.0	1.0	0	0	
27	2	0.0	14.1	2.0	0.0	1	0	
28	4	0.0	14.1	4.0	0.0	0	0	
29	2	0.0	14.0	2.0	0.0	0	0	
30	1	0.0	13.9	1.0	0.0	0	0	
31	1	0.0	13.9	0.0	1.0	0	0	
34	2	0.0	13.8	2.0	0.0	0	0	
37	1	0.0	13.7	1.0	0.0	0	0	

PERCENT AGREEMENT = 13.7 [39 TESTS]
 PERCENT PLUS BIAS = 13.4 [38 TESTS]
 PERCENT MINUS BIAS = 72.9 [207 TESTS]
 TOTAL NUMBER COMPARISONS= 206
 TOTAL NUMBER UNABLE TO AGE= 16

Figure 3B. Within agency POP surface vs. break-and-burn



*** N VERSUS Y ***

CRUISE# 8202Z				DATE# 1982		SPECIES# 301	
AGE	# AGED	% AGR	CUM. %	-BIAS	+BIAS	-1 BIAS	+1 BIAS
6	1	100.0	100.0	0.0	0.0	0	0
7	3	33.3	50.0	2.0	0.0	2	0
8	7	71.4	63.6	0.0	2.0	0	2
9	4	50.0	60.0	0.0	2.0	0	2
10	3	100.0	66.7	0.0	0.0	0	0
11	9	33.3	55.6	1.0	1.0	1	2
12	18	55.6	55.6	4.0	4.0	4	4
13	16	37.5	50.0	1.0	7.0	1	5
14	12	33.3	47.9	2.0	0.0	2	3
15	10	40.0	45.6	1.0	4.0	1	3
16	8	37.5	44.9	2.0	4.0	0	0
17	10	30.0	43.5	2.0	1.0	1	4
18	10	22.2	40.5	2.0	12.0	1	6
19	22	27.3	30.5	2.0	14.0	2	4
20	9	15.4	36.6	0.0	11.0	0	4
21	13	0.0	34.7	0.0	9.0	0	1
22	6	16.7	34.1	0.0	5.0	0	3
23	5	0.0	33.1	0.0	4.0	0	0
24	4	0.0	32.4	0.0	4.0	0	1
25	6	0.0	31.7	0.0	4.0	0	1
26	7	14.3	31.1	0.0	6.0	0	0
27	4	0.0	30.5	0.0	7.0	0	1
28	7	0.0	29.5	0.0	9.0	0	1
29	9	0.0	28.2	0.0	9.0	0	0
30	18	10.0	27.4	0.0	6.0	0	1
31	7	14.3	27.0	0.0	5.0	0	0
32	5	0.0	26.5	0.0	4.0	0	0
33	1	0.0	26.4	0.0	4.0	0	0
34	4	0.0	25.9	0.0	1.0	0	0
35	1	0.0	25.8	0.0	1.0	0	0
36	3	0.0	25.5	0.0	1.0	0	0
37	2	0.0	25.3	0.0	2.0	0	0
38	1	0.0	25.2	0.0	1.0	0	0
39	4	0.0	24.8	0.0	4.0	0	0
40	3	0.0	24.5	0.0	3.0	0	0
41	3	0.0	24.2	0.0	1.0	0	0
42	1	0.0	24.1	0.0	1.0	0	0
43	3	0.0	23.9	0.0	3.0	0	0
44	1	0.0	23.8	0.0	1.0	0	0
45	3	0.0	23.5	0.0	3.0	0	0
46	1	0.0	23.2	0.0	1.0	0	0
47	3	0.0	22.9	0.0	3.0	0	0
48	1	0.0	22.9	0.0	1.0	0	0
49	3	0.0	22.9	0.0	3.0	0	0
50	1	0.0	22.9	0.0	1.0	0	0
51	3	0.0	22.9	0.0	3.0	0	0

PERCENT AGREEMENT = 22.9 [83 TESTS]
 PERCENT PLUS BIAS = 64.0 [187 TESTS]
 PERCENT MINUS BIAS = 9.1 [25 TESTS]
 TOTAL NUMBER COMPARISONS = 275
 TOTAL NUMBER UNABLE TO AGE = 24