Northwest Power and Conservation Council

November 29, 2007

DECISION MEMORANDUM

TO: Council Members

FROM: Jim Ruff -- Manager, Mainstem Passage and River Operations

SUBJECT: Recommendations for future funding for the Comparative Survival Study (CSS) Project #19960200

PROPOSED ACTION: Recommend that Bonneville fund the CSS project in FY08 and FY09 at an annual amount estimated to be between $800,000 and $900,000.[1] The funding is to be used to continue the current level of tagging for Snake River spring/summer Chinook salmon and to allow for an increase in tagging effort for Snake River hatchery steelhead. The funding is not to be used to tag downriver mark groups, as the recommendation is to eliminate that element of the CSS proposal. The proposed action is consistent with the report and recommendations just received from the ISAB/ISRP.

SIGNIFICANCE: A year ago the Council approved interim funding for the CSS project for FY 2007 only, with adequate funding for PIT-tagging Snake River Spring/Summer Chinook salmon at a level consistent with the FY 2006 level, plus a requirement that the project sponsors produce a 10-year Retrospective Summary Report for ISAB and Council review. The Council recently received the ISAB/ISRP's review of the CSS 10-year Retrospective Summary Report. The science review of this project was largely favorable, e.g., the independent science panels jointly found that the CSS FY 2007-09 proposal "Meets Scientific Review Criteria" for continuing three major biological objectives of this project, but not the fourth objective. Thus funding for this project is necessary to enable the project to continue PIT-tagging Snake River Spring/Summer Chinook salmon, and increase the level of tagging for Snake River steelhead, in FY08 and FY09 to fulfill the first three

[1] At the time this memo was prepared, Bonneville was still developing revised FY 2008-09 budget estimates for the CSS project. Staff expects to have improved budget estimates from Bonneville by the December Council meeting.

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biological objectives, specifically 1) estimate smolt-to-adult survival rates (SARs), 2) compare SARs to the SAR hydro goal, and 3) evaluate transport to control (T/C) ratios. Consistent with the ISAB/ISRP report findings, the proposed action does not include future funding for the fourth objective of the CSS project, namely tagging downriver stocks and conducting upriver/downriver comparisons.

BUDGETARY/ECONOMIC IMPACTS

In October 2006, the Council recommended, and Bonneville approved, interim funding of $915,444 for FY 2007 for the following work for the CSS project: a) continue the existing (FY 2006) level of PIT-tagging of Snake River spring/summer Chinook; and b) complete a 10-year Retrospective Summary Report for ISAB and Council review. The Council's recommendation withheld future funding for this project in FY 2008 and 2009 until after the 10-year summary report could be prepared and reviewed. The Council did, however, include placeholder funding of $765,000 for the next two years as part of the final FY 2007-09 budget recommendations to Bonneville under the Fish and Wildlife Program, pending science and Council reviews.

The CSS 10-Year Retrospective Summary Report was completed on schedule on August 31, 2007, and submitted to both the ISAB and ISRP for their science review. The science panels' review of the Retrospective Summary Report was completed on November 19, 2007.

The proposed action is part of the Council's Fish and Wildlife Program and is estimated to cost Bonneville between $800,000 and $900,000 in FY 2008 and FY 2009. Bonneville, in its FY 2007-09 budget decision document, concurred with the Council recommendation to continue funding for tagging under this project in FY 2007 consistent with FY 2006 tagging levels. Bonneville, however, deferred from making any budget recommendations for the CSS project for FY 2008 and FY 2009 upon its review of the ISAB/ISRP review and the Council's subsequent deliberations and recommendations.[2]

BACKGROUND

The CSS project has been one of the most scrutinized and reviewed projects in the Fish and Wildlife Program. In addition to the ongoing ISRP science review of all projects in the program, in 2005 the Council formulated two questions and requested the ISAB to review the CSS 2005 Annual Report. The questions the Council asked the ISAB to address at that time were:

> *Council Question 1: Are the design, implementation, and interpretation of the statistical analyses underpinning the report based on the best available methods? Does the ISAB have suggestions for improving the analyses?*
>
> *Council Question 2: What is the applicability of the CSS results, taking into account whatever scientific criticisms of the analyses that the ISAB decides are valid, if any? In*

[2] Due to the extended period of time needed for ISAB/ISRP review of the CSS 10-year Retrospective Summary Report, for FY 2008 Bonneville has held the funding level for the CSS project to its FY 2007 funding level of $915,444. Bonneville recently renewed funding for the CSS to maintain its present scope and budget level for an additional 90 days - expiring February 29th (at $550,650).

other words, what weight should the analyses be given and what qualifiers should be considered when using the analyses for decision-making?

These two questions were given provisional answers in the 2006 ISAB review, and a number of specific concerns were identified by the ISAB that made the CSS annual report an inadequate source of information to fully answer those questions. The ISAB review of the CSS 2005 Annual Report (ISAB 2006-3[3]) included a recommendation for the CSS sponsors to prepare a summary and retrospective synthesis of the first 10 years of the project, which was needed by the ISAB to provide clear answers to the questions posed by the Council, as well as to support other management applications and scientific interpretations of the CSS results.

CSS Proposal Background

The FY 2007-2009 CSS project proposal identified four biological objectives.

1. Estimate smolt-to-adult survival rates (SARs). Estimate SARs for transported wild and hatchery stream type Chinook and steelhead.
2. SAR Hydro Goal. Determine if SAR rates are significantly different from the Council's interim SAR hydro goal.
3. T/C Ratios. Estimate transport/control ratio and in-river survival rates for wild and hatchery yearling Chinook and steelhead concurrently over a number of years in order to span a range of environmental conditions.
4. Upriver/Downriver Comparisons. Compare SARs of in-river and transported upriver stocks to downriver indicator stocks.

In the FY 2007-09 CSS project proposal these tasks would be accomplished by PIT-tagging various steelhead and Chinook stocks as indicated in Tables 1 and 2.

Table 1. Number of hatchery steelhead, hatchery Chinook, and additional wild Chinook smolts to be PIT tagged specifically for CSS project.

Organi-zation	Budget Contacts	Tagging Site	Species and rearing type	PIT tag quota
IDFG	S. Kiefer	Magic Valley, Hagerman,	H Steelhead	(50,000 LSRCP)
	R. Duke	Clearwater, and Niagara Springs	H Steelhead	30,000 BPA
	E. Buettner	Rapid R Hatchery	H Chinook	52,000
		McCall Hatchery	H Chinook	52,000
		Salmon R Trap	W Chinook	5,000[A]
		Snake R Trap	W Chinook	2,000[A]
		Clearwater R Trap	W Chinook	3,200
		Clearwater R Trap	W Steelhead	1,400
		Other IDFG tributary traps	W Chinook	14,500[B]
ODFW	R. Carmichael	Irrigon Hatchery	H Steelhead	20,000
		Lookingglass Hatchery		
		• Imnaha R AP release	H Chinook	21,000[C]
		• Catherine Ck AP release	H Chinook	21,000[C]
		Grande Ronde R trap	W Chinook	1,400[A]
USFWS	D. Wills	Dworshak Hatchery	H Steelhead	25,000
	H. Burge	Dworshak Hatchery	H Chinook	52,000
		Carson Hatchery	H Chinook	15,000

[3] ISAB Review of the 2005 Comparative Survival Studies' Annual Report and Applicability of Comparative Survival Studies' Analysis Results: www.nwcouncil.org/library/isab/isab2006-3.htm

[A] Additional smolts to be PIT tagged above the current SMP tagging quota levels.
[B] Cost for PIT tags only to complement on-going PIT tagging efforts in Idaho.
[C] Fish PIT tagged in the fall of the contract year for the next year's migration.

In addition, ODFW, under the project *Salmonid Productivity, Escapement, Trend, and Habitat Monitoring in the John Day River Subbasin* (199801600), is anticipated to collect and PIT-tag roughly 6,000 wild Chinook and 6,000 wild steelhead in the John Day River Basin.

In a letter dated September 24, 2007, from Michele DeHart (CSS Project Leader) to Tracy Hauser (BPA), it was indicated the CSS wished to PIT-tag the following groups for FY 2008:

Table 2. Number of wild and hatchery Chinook and steelhead requested to be PIT-tagged under CSS contract in 2008.

Organization	Tagging Site	Species and rearing type / Location (new or existing)	PIT tags needed	Date tags Needed
IDFG	Magic Valley Hatchery	H Steelhead /upriver (new)	13,134[A]	1/1/08
	Hagerman NFH	H Steelhead /upriver (new)	7,666[A]	1/1/08
	Clearwater Hatchery	H Steelhead /upriver (existing)	5,200[A]	1/1/08
	Niagara Springs Hatchery	H Steelhead /upriver (existing)	28,000	1/1/08
	Rapid R Hatchery	H Chinook /upriver (existing)	52,000	1/15/08
	McCall Hatchery	H Chinook /upriver (existing)	52,000	1/15/08
	Salmon R. Trap	W Chinook /upriver (existing)	5,000	3/5/08
	Snake R. Trap	W Chinook /upriver (existing)	2,000	3/5/08
	Clearwater R. Trap	W Chinook /upriver (existing)	3,200	3/5/08
	Clearwater R. Trap	W Steelhead /upriver (existing)	2,000	3/5/08
	Other IDFG trib. traps	W Chinook /upriver (existing)	14,500[B]	2/6/08
ODFW	Irrigon Hatchery	H Steelhead /downriver (exist.)	13,000[A]	12/1/07
	Lookingglass Hatchery:			
	• Imnaha R. release	H Chinook /upriver (existing)	21,000[C]	9/3/08
	• Catherine Ck. release	H Chinook /upriver (existing)	21,000[C]	9/3/08
	Grande Ronde R. Trap	W Chinook /upriver (existing)	1,400	3/5/08
	John Day River	W Chinook /downriver (existing)	6,000[D]	
		W Steelhead /downriver (existing)	6,000[D]	
USFWS	Dworshak NFH	H Steelhead /upriver (new)	8,000[A]	12/12/07
	Dworshak NFH	H Chinook /upriver (existing)	52,000	12/12/07
	Carson NFH	H Chinook /downriver (existing)	15,000	12/12/07
Warm Springs Tribe	Warms Springs R. Trap (Deschutes River Basin)	W Chinook /downriver (new)	6,000	2/20/08

[A] Fish PIT tagged under CSS contract to complement the LSRCP's proposed steelhead hatchery evaluation (tagging) study.
[B] Cost for PIT tags only to complement on-going wild Chinook PIT tagging efforts in Idaho.
[C] Fish to be PIT tagged in September 2008 for the 2009 migration.
[D] Fish PIT tagged under CSS contract only if project is not renewed under existing ODFW contract with BPA.

This proposal for FY 2008 includes additional marking of upriver wild steelhead, hatchery A and B run steelhead from the Snake River Basin, as well as Warm Springs River (Deschutes subbasin) wild spring Chinook. However, if ODFW's John Day monitoring and evaluation project (199801600) did not receive funding in FY 2008 for PIT-tagging 6,000 wild spring Chinook and 6,000 wild steelhead in the John Day Basin, the tagging of these stocks would be added to the CSS project request as well.[4]

Summary of ISAB/ISRP Review of the CSS Ten-Year Retrospective Summary Report

The science panels recently reviewed the CSS 10-Year Retrospective Summary Report, which was completed in August 2007 in response to the ISAB 2006-3 recommendations and a directive from the Council. This joint ISAB and ISRP review was requested by the Council, which also asked that the ISAB and ISRP evaluate the responsiveness of the Retrospective Summary report to comments in ISAB 2006-3 review and to provide more definitive answers to the Council's two questions above. As part of this review, the CSS project sponsors briefed the ISAB/ISRP members on their 10-year Retrospective Summary Report and responded to members' questions about the project on September 14, 2007. The joint science panels' November 19, 2007, report[5] is the most recent in a series of ISAB and ISRP reviews of the CSS project.

In the Executive Summary of their review report, the ISAB and ISRP found that, "Overall, the CSS Ten-Year Retrospective was effective in answering the concerns posed by the ISAB's review of the CSS 2005 Annual Report (ISAB 2006-3). The Retrospective provided improved clarity in the presentation and explanation of the sophisticated methodologies used in analyses of CSS data. The scope of CSS investigations resulted in an extensive report, containing many detailed summaries of past and present work, and the report presents key data and data summaries in support of their major conclusions. The CSS team has responded very well in a short time frame to the difficult challenge of including enough details to allow scientific review, while avoiding obfuscation by sheer volume of material."

In their report, the ISAB and ISRP found that the CSS 10-year Retrospective Summary Report is "clear, thorough, responsive to past ISAB comments, and was completed in a retrospective style, a major accomplishment for which we commend the CSS investigators." In addition, the ISRP found "that the CSS FY 2007-09 proposal Meets Scientific Review Criteria (In Part)." Specifically, the ISRP found that "the first three biological objectives of the CSS proposal (Estimate Smolt to Adult Survival Rates [SARs], SAR Hydro Goal, and Transport to Control [T/C] Ratios) meet scientific review criteria. However, the ISRP found that the fourth objective (Upriver/Downriver Comparisons) does not meet scientific review criteria, because of inevitable confounding from other factors in establishing cause(s) of upriver/downriver differences that may be detected, regardless of sample size and detection power that could be achieved."

Specifically, both the ISRP and ISAB concurred "that the upriver/downriver comparative analyses, with ensuing inferences of causation, should be discontinued." While the review states that the basic data on performance of both upriver and downriver stocks may have value in basic

[4] However, staff has learned that ODFW is expected to receive Bonneville funding for PIT-tagging of wild spring Chinook and steelhead in FY 2008 under its John Day Basin monitoring and evaluation project (199801600).

[5] ISAB/ISRP Review of the Comparative Survival Study's Ten-year Retrospective Summary Report: www.nwcouncil.org/library/isab/isabisrp2007-6.htm

monitoring and evaluation efforts, "inevitable confounding in the sampling design precludes unambiguous interpretation of [the] cause of upriver/downriver differences [in stock survivals]."

With respect to Council question #1, and similar to the ISAB's review of the 2005 CSS Annual Report, the latest ISAB/ISRP review found that "the design, implementation, and interpretation underpinning the 10-Year Retrospective Report are very good. The CSS constitutes a successful implementation of a large-scale tagging program." Moreover, the review found that "the CSS has benefitted from using PIT-tags from other marking programs," and conversely other projects have benefitted from using the tagged fish from the CSS project.

With respect to Council question #2, the recent ISAB/ISRP review found that "the CSS results are based upon carefully considered and applied methods of analysis," and the review supports "the CSS efforts to refine [its] analytical methodology, analyze other data, and design additional studies to collect more data to answer important questions for the region."

The latest science review found "many well-supported interpretations in the CSS Retrospective [Summary Report] that should be carefully considered by Council and other decision-makers," which are discussed in greater detail in section V. of their report. However, the review also stated that "caution is always needed in interpreting results, and the assumptions that are used in interpretation, as well as measures of uncertainty, must be taken into account in deciding the application of any interpretation."

ANALYSIS

Implementing the proposed action would mean that three of the four major objectives and associated work elements of the CSS project met scientific review criteria and can continue, e.g., PIT-tagging Snake River spring/summer Chinook salmon at the current level of effort, and increasing the tagging of Snake River steelhead stocks as recommended by the ISAB/ISRP. Thus there would be no interruption in the ongoing CSS marking program for FY 2008 and FY 2009, and the scope and level of effort for this project would remain largely consistent with the Council's interim funding recommendation of October 2006.

It is noteworthy that, while the CSS project has benefited from using PIT-tags from other fish marking programs, other projects and marking programs have also benefited from using PIT-tags from the CSS large-scale marking program. Both science review panels and the Council have encouraged greater cooperation among the various PIT-tag marking programs in the Columbia River Basin to address critical uncertainties and improve the reliability of survival estimates.

The proposed action, however, does not include future funding for the fourth objective of the CSS project, namely continuing to tag downriver stocks and conduct upriver/downriver comparisons. This is based on the science review panels' finding that the upriver/downriver comparison, with its associated tagging and tasks of downriver stocks, "does not meet scientific review criteria." While basic data on the performance of individual upriver and downriver stocks may have value as part of a comprehensive, basinwide monitoring and evaluation program, the ISAB/ISRP review found "inevitable confounding in the sampling design precludes unambiguous interpretation of cause of upriver/downriver differences [in stock survivals]." Cause and effect interpretations are problematic because, according to the science review panels, there is geographical variation in habitat types, differences in [stock] productivity, predator

populations, local climatic conditions, and different times of ocean entry, ocean experiences and harvest rates, among other factors.

The science panels stated "the core reason a contrast of salmon survival between upriver and downriver locations is not advised is that the populations in tributaries downriver of the [mainstem] dams are not replicates of the upper Snake River populations." In addition, the scientists assert that, "even if statistical differences between upstream and downstream stocks were found with increased sample size, it would be extremely difficult to determine the actual causes of the difference." Thus, the science panels concluded that "the system is too complex, and the possible sampling design necessarily too constrained in time and place, to reach conclusive findings on causation from [an upriver/downriver] type of comparison."

Accordingly, since the upriver/downriver comparison objective and associated work elements do not meet scientific review criteria, the proposed action recommends ceasing the existing PIT-tagging at Carson National Fish Hatchery (15,000 yearling Chinook salmon) and at the Irrigon Fish Hatchery (13,000 steelhead), as well as the CSS-proposed expanded tagging of wild spring Chinook in the Warm Springs River under the CSS project. In addition, the tagging of up to 6,000 each wild spring Chinook and steelhead in the John Day River is not justified nor recommended as part of the CSS project. However, as noted above, the tagging effort in the John Day Basin is already included as part of a separate ongoing monitoring and evaluation project, e.g., ODFW's John Day Basin monitoring and evaluation project #199801600.

Finally, since the science review panels again state that "expanded tagging of hatchery steelhead in the Snake River subbasin … appears justified to improve the estimates of metrics to accomplish biological objectives 1-3," the proposed action also calls for implementation of expanded tagging of additional Snake River hatchery steelhead stocks as identified in Table 2.

ALTERNATIVES

One alternative is to allow all four biological objectives of the CSS project to be implemented in entirety in FY 2008 and FY 2009. This option would be more costly than the proposed action because it would allow additional PIT-tagging and analysis of downriver mark groups of both spring Chinook and steelhead. This option is not recommended because the fourth biological objective, e.g., marking downriver groups for upriver/downriver comparative analyses, did not meet the science review panels' scientific criteria due to the reasons stated above and in the ISAB/ISRP's report 2007-6. In essence, the science panels stated that definitive conclusions about the effects of the hydrosystem based on upriver/downriver comparisons are not scientifically defensible. This does not mean that upriver/downriver differences in survival are absent, but rather the methods used to identify the cause(s) of these differences are insufficient. Thus the science panels recommended, and staff concurs, that this fourth objective and its associated work elements should be discontinued in the future.

A second alternative would be to implement the proposed action except for the additional marking of Snake River hatchery steelhead groups. This option is not recommended because the ISRP, in its science review of the CSS project proposal for FY 2007-2009 and in its 2006 review, concluded that expanded tagging of hatchery steelhead in the Snake River subbasin appears to be justified to improve the estimates of performance metrics to accomplish biological objectives one through three of the project.

A third alternative would be to discontinue the entire CSS project and terminate the PIT-tagging of Snake River spring/summer Chinook salmon and steelhead, as well as the downriver mark groups. This option is not recommended because the ISAB/ISRP, in their science review of this project, found that biological objectives one through three and associated work elements met scientific review criteria. Those objectives include: 1) estimating smolt-to-adult survival rates (SARs); 2) comparing SARs to the SAR hydro goal; and 3) evaluating transport to control (T/C) ratios. Overall, the science review panels' determined that: a) the CSS 10-year Retrospective Summary Report was effective in answering the concerns posed by the ISAB's earlier review (ISAB 2006-3) of the CSS 2005 Annual Report; b) the summary report presents key data and data summaries to support their major conclusions; and c) the CSS results are based upon carefully considered and applied methods of analysis. Thus the first three biological objectives of the CSS project constitutes a successful implementation of a large-scale fish tagging program which should be continued (in part) and not terminated.

Other Recommendations

Other recommendations specific to the CSS project that were outlined in the ISAB/ISRP science review include:

1. The project should encourage greater cooperation and coordination among various PIT-tag marking programs to help address critical uncertainties and improve the reliability of survival estimates. PIT tags from other marking programs have been used to augment the CSS project tagging, and vice versa. Greater coordination among tagging programs could result in improved tagging efficiencies in both Bonneville-funded and Corps-funded research in the Columbia River Basin.

2. The project sponsors should continue efforts to refine their analytical methodology, analyze other data, and design additional studies to collect more data to answer important management questions relating to mainstem fish passage alternatives.

3. The project should provide direct assessments of SARs and TIR values for fish transported from both Little Goose and Lower Monumental dams in comparison with the undetected and Lower Granite transport groups. The project should consider using fish that were detected at least once at a dam to provide insights into temporal changes in adult return rates of transported and non-transported fish.

4. The project sponsors should prepare and submit for peer-reviewed publication a major synthesis paper, highlighting central results and interpretations of the CSS study to date.

Other recommendations for future research efforts outlined in the ISAB/ISRP science review, which the staff understands are *not specific* to the CSS project, include:

a) Initiate a comprehensive study to determine why the PIT-tagged Snake River wild spring/summer Chinook are producing lower SARs than the unmarked wild Chinook.

b) Initiate a study to determine why wild spring-summer Chinook appear to gain no benefit from transportation (TIR~1.0) compared to hatchery Chinook and steelhead.

Attachment

State, Federal and Tribal Fishery Agencies Joint Staff Letter

Columbia River Inter-Tribal Fish Commission
Idaho Fish and Game
Oregon Department of Fish and Wildlife
Washington Department of Fish and Wildlife
US Fish and Wildlife Service

November 29, 2007

James Ruff
Northwest Power and Conservation Council
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Dear Jim:

We understand that at its December meeting the NPCC will be making funding decisions regarding the Comparative Survival Study (CSS) in response to comments and recommendations from the Independent Science Advisory Board and Review Panel. This is an important funding decision in the Columbia River basin and a decision that should be well informed. Neither we nor our CSS Oversight Committee have had the opportunity to further discuss the comments and recommendations of the ISAB/ISRP with them however; we offer the following comments and recommendations.

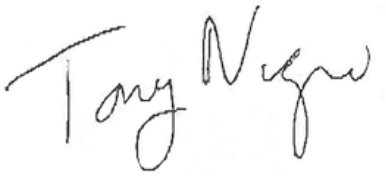
We recommend that the NPCC approve marking of all groups as proposed by the fishery managers in the CSS. The ISAB/ISRP review recognized the CSS is successfully implementing a large-scale monitoring program and the review supports the PIT tag marking of additional wild downriver groups to determine SARs and other population metrics for these stocks as part of regional monitoring and evaluation. Many stocks in addition to those of Snake River origin are affected by the operation of the FCRPS and the measures mitigate for those effects, including the downriver steelhead populations proposed for marking that are listed under the ESA. Eliminating these downriver mark groups or delaying the implementation of mark groups will cause critical gaps in these time series. These gaps in SARs will make assessing population status and evaluating restoration and recovery measures difficult and less timely.

More specifically, the ISAB/ISRP indicated that CSS biological objectives (1), (2), and (3) and associated work elements meet scientific review criteria – estimate SARs, in-river survival rates, T/C ratios and make comparisons against hydro goals. The downriver populations proposed for tagging are needed to satisfy these three objectives.. The ISAB/ISRP did not recommend eliminating the tagging of downriver groups for these monitoring and evaluation purposes. Building a time series of survival among representative population groups provides important empirical data for assessing the relationship of this survival information to environmental effects and management actions. This monitoring and evaluation approach does not assume that survival differences are only attributable to hydrosystem impacts.

At an appropriate time, the Oversight Committee would like to have the opportunity to further discuss the comments or address concerns with the ISAB/ISRP. The ISAB/ISRP review of CSS Ten-Year Retrospective Report was overall very positive, finding that the design, implementation and interpretation underpinning the

report were very good, and that the CSS successfully implemented a large-scale monitoring program. We believe that had the schedule afforded the fishery managers the opportunity to further discuss technical issues with the ISAB/ISRP, that all issues concerning downriver marking could have been resolved. The CSS Oversight Committee will provide a separate technical response to the ISAB/ISRP comments relative to the downriver and upriver comparisons. We look forward to further discussions on this and other important matters.

Sincerely



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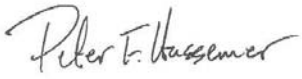

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