



Workshop „Masterplan Wanderfische Rhein“

27./28. April 2010, Freiburg

*Themenkomplex: Habitatmaßnahmen und Besatz*

**Natural reproduction of reintroduced  
salmon populations in the river Sieg (NRW)  
- - Status quo and Perspectives -**

Data from studies of LANUV (NRW, Germany),  
assembled by A. Nemitz (Rhineland Fishery-Association),  
presented by K. Schindehütte, MUNLV (NRW, Germany)

## Migrating Fish Program NRW

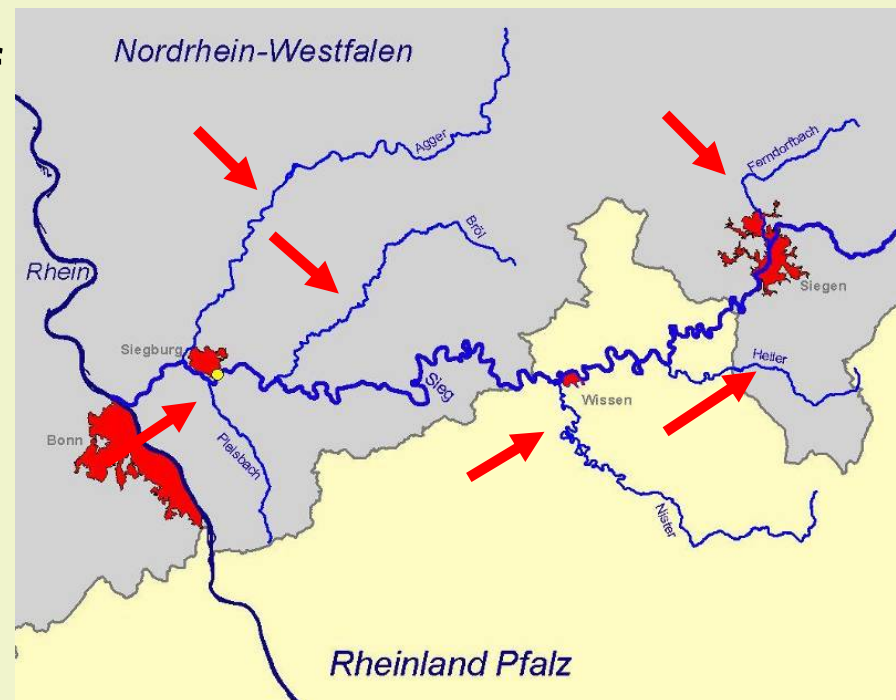


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## The river Sieg as a model of salmon reintroduction in North Rhine-Westphalia

- Length: 153 km; catchment area: 2.861 km<sup>2</sup>; mean discharge: 53 m<sup>3</sup>/s
- Main tributaries: Agger, Bröl, Pleisb., Nister, Heller, Ferndorf
- Geologic formation: slate
- Water quality: predominantly good-moderate
- Re-introduction of salmon since 1988
- Main study area for accompanying scientific studies and monitoring (MFP)
- 2 control stations: „Buisdorf“ and „Troisdorf“
- Co-operation across the borders North Rhine-Westphalia / Rhineland Palatinate



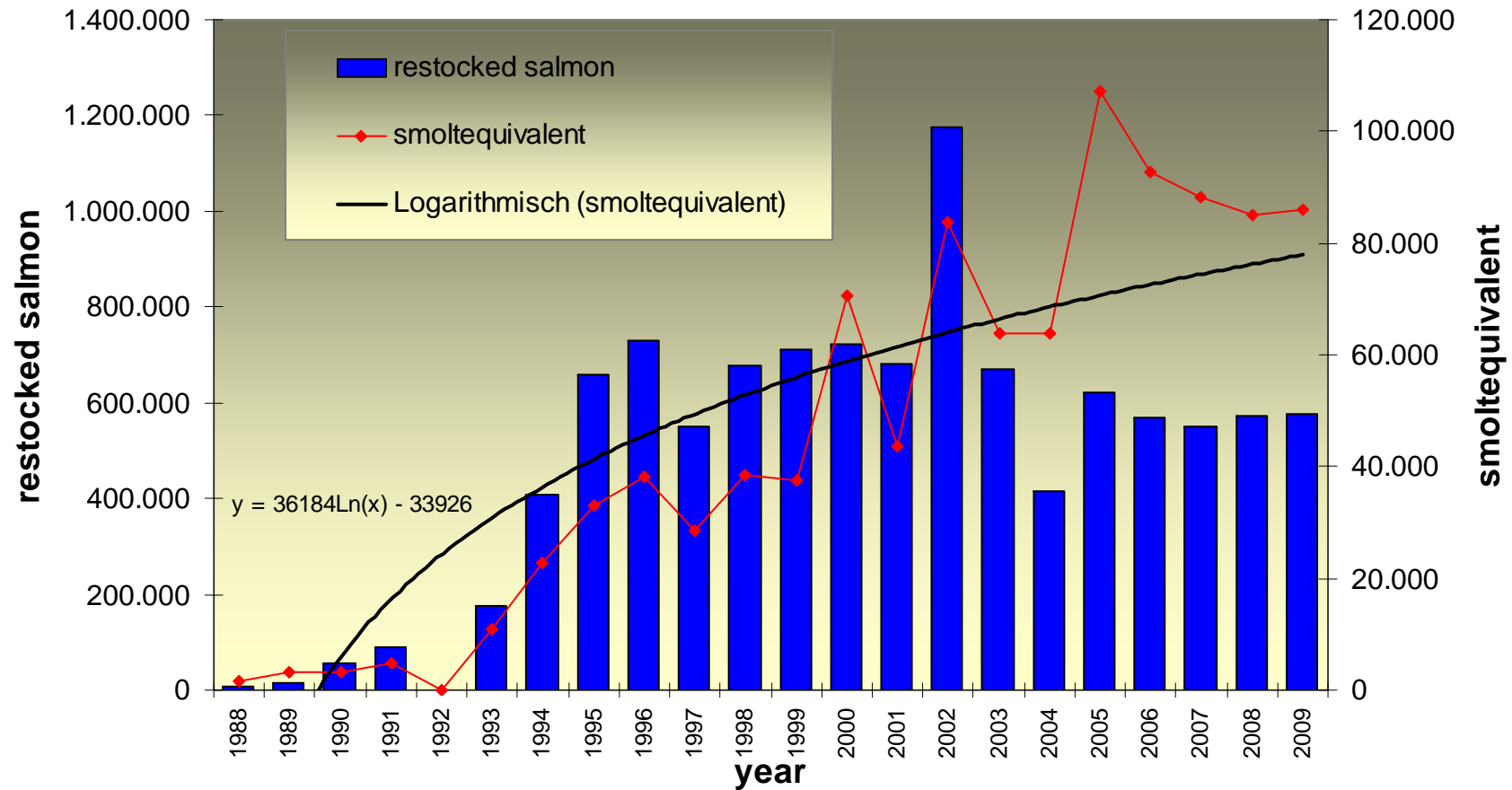
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## Development of restocking (smoltequivalents) at Sieg (NRW)



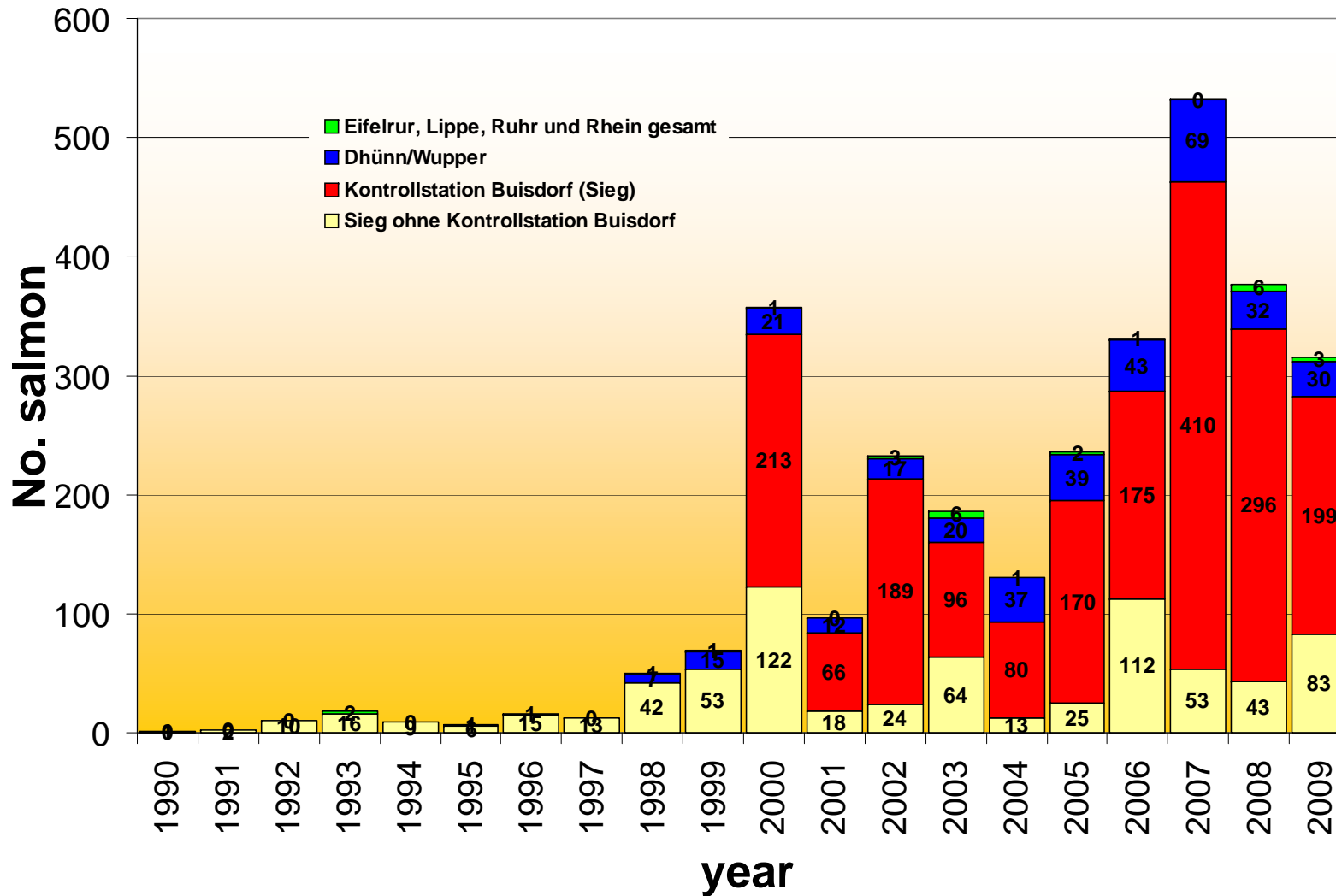
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## Salmon returners in North Rhine-Westphalia since 1990



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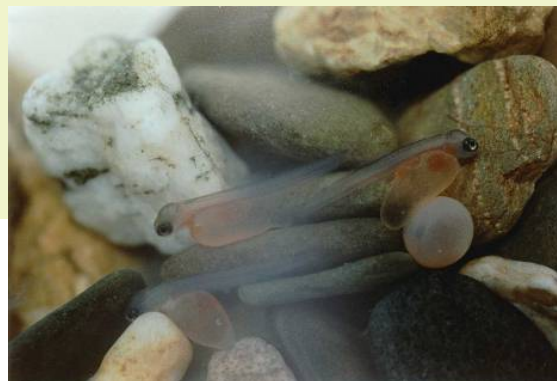
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## Monitoring of natural reproduction

1994 to 2001	2001 to 2002	from 2003
qualitative detection	working on method and sampling period, development of standardization	standardized method, quantitative detection

- **Standardized method: modified point-abundance electro-fishery**
- **Monitoring period: June, before stocking with 0+-parrs**
- **Complemented with standardized mapping of spawning-grounds in previous year (incl. genetic check of fry-samples (since 2004))**



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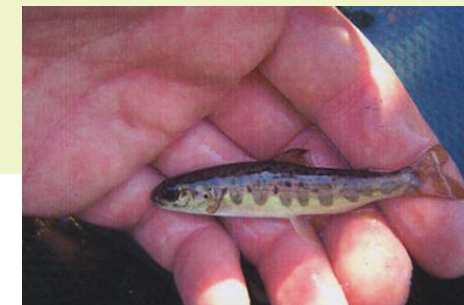
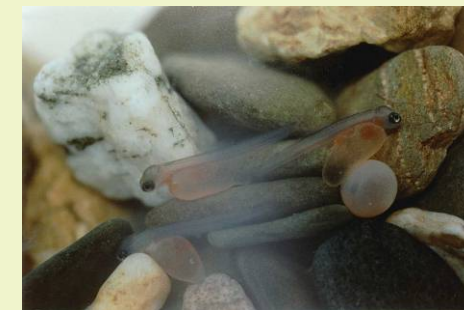
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## Natural reproduction of salmon in North Rhine-Westphalia

year	Sieg Bröl	Homburger Bröl	Waldbröl	Agger	Naafbach	Pleisbach	Krabach	Hanfbach	Gierzhagener Bach	Sülz	Schlingenbach	Dhünn
	mean density in habitats [parrs /100 m <sup>2</sup> ]											
1994	x	x		x								
1997		x										
2001	x	0	0	0	4	0				0		
2002	0	0	0	0	0			0	0	0	0	0
2003	3	1		3								
2004		3	2	0	39	10	0	0				
2005		0	8	0	13	44	x	x				x
2006		4	1	11	3	12				1,2*		2,7*
2007		21	x	39	56	285	x		x		x	
2008					146	348					56	
2009		39	0		57	135	x				44	

x = qualitatively  
\* = only in one habitat



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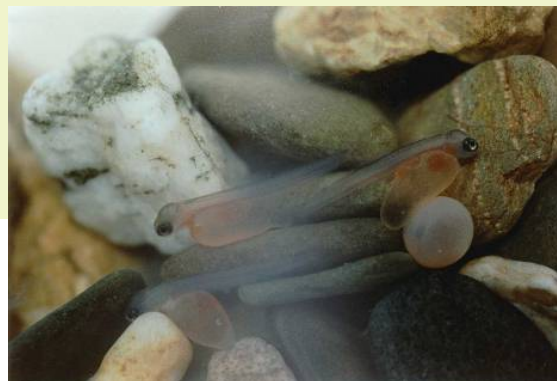


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## Natural reproduction of salmon in North Rhine-Westphalia – using the river Agger as an example

year of sampling	stocking 0+ [Ind.]	no. sampled habitats (n)	production [Ind.]	relation to amount of stocking [%]	potential production max. [Ind.]	relation to amount of stocking [%]
2003	128.000	10	161	0,1	3.628	2,8
2004	7.500	6	3.860	51,5	49.558	660,8
2005	128.060	19	6.254	4,9	16.274	12,7
2006	130.924	14	1.219	0,9	4.375	3,3
2007	141.800	15	23.003	16,2	71.772	50,6
2008	62.800	19	60.631	96,5	187.418	298,4
2009	22.000	16	12.565	57,1	72.970	331,7
<b>Total:</b>	<b>621.084</b>	<b>99</b>	<b>107.693</b>	<b>17,3</b>	<b>405.995</b>	<b>65,4</b>



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### Restocking strategies in areas of natural reproduction – River Agger (NRW)

- Gradual reduction of restocking, depending on salmon densities from natural reproduction:
  - 1) 50 Individuals/100m<sup>2</sup> → no restocking
  - 2) 30 Individuals/100m<sup>2</sup> → reduced restocking
- Restocking with fin-clipped parrs only in areas with 30 or less Individuals / 100m<sup>2</sup>.
- Monitoring of (Agger-) returners, in order to calculate the ratio from natural reproduction







## **Summary & conclusions, Sieg river system**

- Evidence of natural reproduction of salmon since 1994
- Since 2003: standardized monitoring with recording of population densities in spawning areas
- River Agger: tributary with the highest natural reproduction rates of salmon in North Rhine Westphalia
- Carefully calculated, within the last seven years a natural reproduction of approximately 107.000 alevins was observed, which represents 17 % of the total 0+ - stocking in the Agger from 2003 to 2009.
- Through targeted measures (implementation of WFD), it seems to be possible, to improve other tributaries, i.e. river Bröl, up to the state of the Agger, as far as spawning areas are concerned.
- In order to establish self-sustaining populations or even allow salmon fishing (besides a better quality of spawning areas) the return-rate (downstream migration x marine survival x upstream migration) has to improve (0,6 %).

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Thank you!